SIEMENS

MAMMOMAT *Novation*^{DR}

SP

Installation Instructions

and Start-up (DROC)

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Contents 0 - 3

Page

1 Prerequisites 1 - 1

Configuration . . . 1 - 1
Meters, appliances and tools . . . 1 - 2
Auxiliary Materials . . . 1 - 2
Phantoms / Auxiliary . . . 1 - 3
Tools . . . 1 - 3

2 Important Notes 2 - 1

Symbols . . . 2 - 1
Factory Adjustments . . . 2 - 1
Special checks and protocols . . . 2 - 1
Acceptance Test . . . 2 - 1
Protective measures . . . 2 - 2
System Power Supply . . . 2 - 2
PC Boards . . . 2 - 3
Metal Curtain . . . 2 - 3
Measurements with the oscilloscope . . . 2 - 3
Swivel-arm rotation . . . 2 - 3
Service Software . . . 2 - 3
Delay times between exposures . . . 2 - 4

3 Preparatory work 3 - 1

Scope of delivery . . . 3 - 1
Unpacking the system components . . . 3 - 2
MAMMOMAT Stand . . . 3 - 2
Radiation protection shield and control console . . . 3 - 3
Acquisition Workstation . . . 3 - 3
Removing the transport safeguards . . . 3 - 4
Swivel arm . . . 3 - 4
Generator transport safety plates . . . 3 - 5
Lifting carriage . . . 3 - 6
Rotary Motion . . . 3 - 6
Check ball bearings . . . 3 - 7
Protective strips for the metal curtain . . . 3 - 8
Removing the BRICK transportation screws . . . 3 - 8
Mount the metal springs on the base plate . . . 3 - 9

4 Installing the system components 4 - 1

Room Planning . . . 4 - 1
Installing the cable ducts . . . 4 - 2
Aligning the stand . . . 4 - 3
Free-standing radiation shield (option) . . . 4 - 4
Control console . . . 4 - 4
Bolting the stand/radiation shield to the floor . . . 4 - 6

Page

5 Cable connections 5 - 1

Control console cable . . . 5 - 1
Fibre optics cable . . . 5 - 2
Handling . . . 5 - 2
Connecting . . . 5 - 2
Cleaning . . . 5 - 2
Radiation protection door switch . . . 5 - 4
External exposure lamp . . . 5 - 5

6 Mains connection and power up 6 - 1

Mains voltage connection . . . 6 - 1
Electrical power to mains input . . . 6 - 1
Connections . . . 6 - 2
Measuring the line resistance . . . 6 - 3
Checking the power supply voltages . . . 6 - 3
Start-up of the MAMMOMAT . . . 6 - 4

7 Detector installation 7 - 1

Arranging the swivel arm . . . 7 - 1
Unpacking detector . . . 7 - 1
Mounting the detector . . . 7 - 5
Mounting the grid . . . 7 - 6
Adjusting the switches . . . 7 - 7
Installing the swivel arm covers . . . 7 - 8
Attaching the side covers . . . 7 - 8
Attaching the front cover . . . 7 - 9

8 Checking the microprocessors LED's 8 - 1

9 X-ray tube checks 9 - 1

Tube high voltage, current and mAs values . . . 9 - 1
Preparation . . . 9 - 1
Measurement method . . . 9 - 1
Checks with a large focus and without AEC . . . 9 - 3
Checks with a small focus and without AEC . . . 9 - 4
Checks with a large focus and with AEC . . . 9 - 5

10 Collimator Adjustment 10 - 1

Automatic collimator . . . 10 - 1
Collimator reference axis . . . 10 - 1
Collimator check . . . 10 - 2
Collimator beam calibration . . . 10 - 2
Collimator field light calibration . . . 10 - 5
Collimator Wing Difference Calibration . . . 10 - 6

Page

11 Checking dose settings 11 - 1

Enable/Disable Dose Calculation . . . 11 - 1
Configuration of Dose Calculation System . . . 11 - 1
Label . . . 11 - 2
Checking the AEC dose settings . . . 11 - 3
Check the H & D dose settings for Mo/Mo. . . . 11 - 3
Check the H & D dose settings for Mo/Rh and W/Rh. . . . 11 - 5
Adjust the H and D Settings . . . 11 - 6

12 Checking OPDOSE 12 - 1

13 Checking Grid Lines 13 - 1

Grid lines test . . . 13 - 1
TEST 1: Visible grid lines test . . . 13 - 1
TEST 2: Measuring grid lines . . . 13 - 2
Fault elimination . . . 13 - 6
Adjust the grid switch . . . 13 - 6
Adjust the wheel that is mounted on the grid motor . . . 13 - 8
Adjust the grid location . . . 13 - 8
Calibrate the detector. . . . 13 - 8

14 Setting time zone, date and time 14 - 1

MAMMOMAT Stand date and time . . . 14 - 1
DROC time zone, date and time. . . . 14 - 1
Time zone . . . 14 - 1
Date and Time . . . 14 - 3
BRICK date and time . . . 14 - 4

15 Checking the swivel arm system 15 - 1

Rotary motion . . . 15 - 1
Vertical adjustment . . . 15 - 3
Emergency stop . . . 15 - 3

16 Checking and adjusting the field light time 16 - 1

Checking the field light time . . . 16 - 1
Adjusting the field light time . . . 16 - 2

17 Checking the compression device and OPCOMP 17 - 1

Checking the compression device. . . . 17 - 1
Decompression button . . . 17 - 2
Checking the OPCOMP . . . 17 - 2
Adapting OPCOMP . . . 17 - 3

18 Checking the exposure blocking 18 - 1

Page

Checking the exposure blocking . . . . . .18 - 1

19 _____ Acquisition Workstation _____ 19 - 1

General Notes . . . . . .19 - 1
Startup of DROC . . . . . .19 - 2
Define the DROC network settings . . . . . .19 - 3
Define the Acquisition Workstation's host name and IP address: . . . . . .19 - 4
Define the Acquisition Workstation's netmask: . . . . . .19 - 4
Define the Default Network Router IP Address . . . . . .19 - 4
Configure the Acquisition Workstation's DICOM Calling AE Title . . . . . .19 - 8
DICOM Output Devices. . . . . 19 - 10
Configure a DICOM Printer . . . . . 19 - 13
Annotation Box SOP Class (Text-on-Film) . . . . . 19 - 17
Configure a DICOM Viewing station . . . . . 19 - 19
Configure a CD drive . . . . . 19 - 23
Defining Output Device Setups in the Application Software . . . . . 19 - 24
Modality Worklist (MWL) Service . . . . . 19 - 28
Install the Modality Worklist Server Package . . . . . 19 - 28
Add MWL server IP address with host name . . . . . 19 - 29
Configure the MWL service . . . . . 19 - 30
Configure the AE Title for MWL. . . . . 19 - 32
Troubleshooting hints for the MWL configuration . . . . . 19 - 35
Backing Up DROC Acquisition Workstation Software Files . . . . . 19 - 39

20 _____ Image Quality _____ 20 - 1

Checking Image Quality . . . . . .20 - 1
Detector calibration . . . . . .20 - 1
Create a new pixel map. . . . . .20 - 2
Quality Control Manual Tests . . . . . .20 - 4

21 _____ Final procedures _____ 21 - 1

Service PC and measuring instruments . . . . . .21 - 1
Saving the configuration file of the MAMMOMAT stand . . . . . .21 - 1
Reset the exposure counter . . . . . .21 - 1
Deleting the error buffer . . . . . .21 - 1
Saving the MAMMOMAT Parameters . . . . . .21 - 1
Remove the measuring instruments . . . . . .21 - 1
Checking the protective ground resistance . . . . . .21 - 2
Mounting the cable duct covers . . . . . .21 - 2
Mounting the stand covers . . . . . .21 - 3
MAMMOMAT stand. . . . . .21 - 3
Fitting the MAMMOMAT cap . . . . . .21 - 4
Face shield . . . . . .21 - 4
Warning label on control panel . . . . . .21 - 5

22 _____ Changes to previous version _____ 22 - 1

Page

23 Appendix 23 - 1

Troubleshooting Image Quality . . . 23 - 1
Working with the service PC . . . 23 - 4
Description of the syntax used in these instructions . . . 23 - 4
Connecting the service PC . . . 23 - 5
Configuration of the service PC . . . 23 - 5
Configuration of computer BIOS . . . 23 - 5
Configuration of Windows® 2000 Pro . . . 23 - 5
Starting up and using the service PC . . . 23 - 7
Troubleshooting PC connection . . . 23 - 7
DROC Acquisition Workstation Login Accounts . . . 23 - 8
Normal Operation Sequence . . . 23 - 9
Opening the DROC service software . . . 23 - 10
AEC calibration . . . 23 - 11
Array AEC Dark Offset Calibration . . . 23 - 11
AEC Calibration Tool . . . 23 - 13
Determining the Half Value Layer (HVL) . . . 23 - 14
Determine ESE . . . 23 - 16
Generating the Goal Image . . . 23 - 18
DROC Software re-installation . . . 23 - 21
Installing the Solaris CDE operating system software . . . 23 - 21
Installing the Application Software and drivers . . . 23 - 24
Installing the detector specific configuration files . . . 23 - 25
Activate the Siemens application packages . . . 23 - 26
Restore your system backup . . . 23 - 27
Calibrate the system . . . 23 - 27

Configuration

The configuration of the MAMMOMAT *Novation*DR installation depends on the customer's choice.

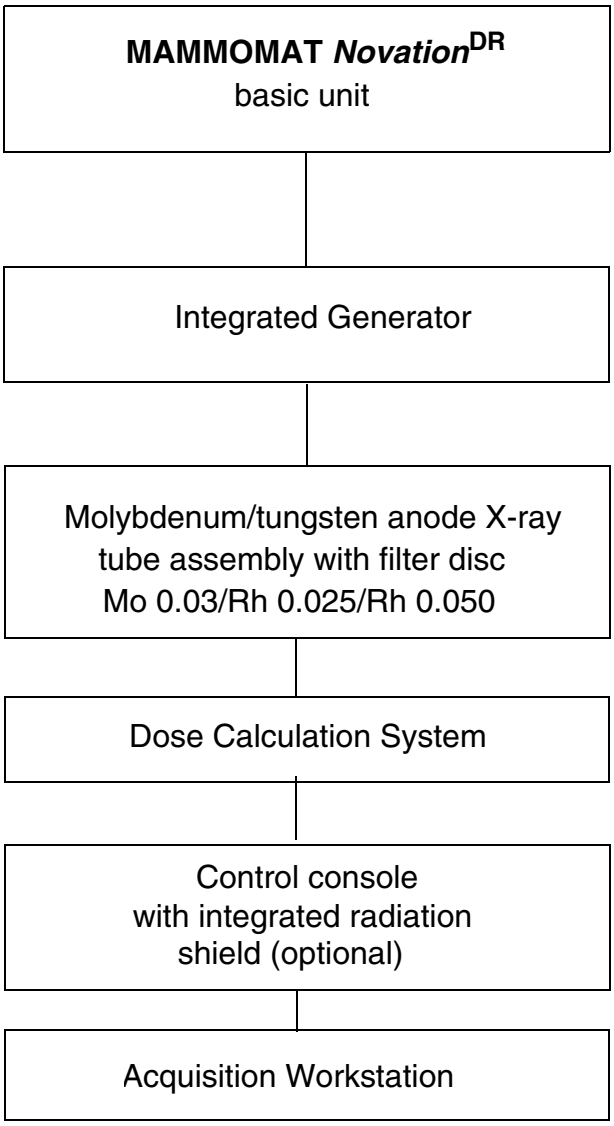


Fig. 1 Configuration

Unless otherwise stated, these instructions describe the installation of the

- MAMMOMAT *Novation*DR Stand with the integrated generator
- radiation shield with the integrated control console
- detector and
- acquisition workstation (DROC).

Depending on the installation configuration, some points may be omitted.

Meters, appliances and tools

Auxiliary Materials

NOTE	Calibrated instruments are required.

Item	Remarks	Material Number	With System
Oscilloscope >50MHz with memory	e.g. TEKTRONIK 314		no
Digital multimeter including an mAs meter	e.g. FLUKE 8060A or FLUKE 87	97 02 101 97 03 976	no
Service PC	See the CS Intranet (**CS/For Service/Common Services/Service Laptop for CSEs)** for details.		no
Power line impedance meter		84 28 104	no
Power ground-wire tester		44 15 899	no
Luminance meter (for monitor calibration)	e.g. Mavo Monitor or Wellhöfer LXplus (05 146 167)	97 02 432	no
Luminance meter (measures the light intensity from the X-ray field)	e.g. SMfit Mammo	88 81 281	no
Dose meter	e.g. Solidose	88 81 323	no
Ion chamber	For dose meter Solidose	88 81 315	no
Densitometer	e.g. X-Rite 331	97 02 416	no
A non-invasive digital kV meter	If not available in the district office, a scope can be used instead.		no

Tab. 1 Meters, appliances and tools

Phantoms / Auxiliary

Item	Remarks	Material Number	With System
RMI 156		88 81 265	no
Three, 2 cm plexi (PMMA)		65 61 232	yes
2 mm steel plate, 30x25 cm		66 55 851	yes
2 mm steel plate, 3x10 cm		66 55 844	yes
One 0.1 mm, two 0.2 mm and one 0.5 mm sheets of aluminum 99% (1100) alloy, 4x4 cm		88 81 273	no
Mammography line pair phantom	2-10 lp/mm	88 81 299	no
Collimator mounted plexi (4 cm)			yes
Compression plate simulator			yes
4.2 cm plexi	Size of the detector	74 47 720	no
Ethernet cable			no
Serial PC cable	RS232 / Array / BRICK	66 55 745	yes
Serial PC cable	RS232 / Stand	99 00 440	no
Cassette / Film 24x30 cm			no
Centering cross		96 60 051	no

Tab. 2 Phantoms and auxiliaries

Tools

Item	Remarks	With System
Standard installation and service tools		no
Torque wrench for bolting the stand/console to the floor		no
Electrical screwdriver with adjustable torque is recommended		no

Tab. 3 Tools

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Symbols



This symbol indicates exposure of X-ray radiation.



This symbol indicates that the measured values have to be entered in the **Installation Protocol** (SPB7-250.813.01...).

Factory Adjustments

The **MAMMOMAT *Novation*^{DR}** is adjusted, programmed and tested in the factory, leaving the adaptation to the on-site mains voltage, adjustment of the AEC and the functional tests to be performed.

When the measurements to be made (kV, mAs, etc.) are within the tolerances stated in these instructions, this confirms that the settings made in the factory have not changed and the equipment is fully serviceable.

The equipment is set to **400 V, 2-phase** on delivery.

Special checks and protocols

Acceptance Test

The acceptance test of the MAMMOMAT *Novation*^{DR} is recommended to be performed whenever a new MAMMOMAT *Novation*^{DR} system has been installed and whenever changes that might affect performance have been made to an existing system.

The acceptance test of MAMMOMAT *Novation*^{DR} involves performance of all QC procedures in this **Quality Control Manual (**SPB7-250.623.02...) ensuring that basic minimum image quality criteria are met before the system is used with patients.

All annual tests from the **Quality Control Manual** have to be performed.

Depending on the country where the system is installed, additional tests have to be performed.

- Tasks relating to RöV §16 regulations have to performed in **Germany**.
- Tasks relating to DHHS regulations have to be performed in the **USA**.
  Maintenance measurements must be made according to the **DHHS Maintenance Instructions** (SPB7-250.662.01...) and the **DHHS Supplements to the instructions for use** (SPB7-250.661.01...). Results must be recorded in **DHHS Measurement certificates** (SPB7-250.663.01...).

Protective measures

System Power Supply

It is very important that any intervention in the equipment will start with disconnecting it from the power supply with the main circuit-breaker. Before removing or inserting any of the printed circuit boards, switch off the equipment.

⚠WARNING

If the system is only switched off at the control panel, the line voltage will still be present at the generator line connection (see wiring diagram).

A life-threatening hazard of electric shock exists.

Disconnect the mains cable and comply with the information on this page.

⚠WARNING

After shut-down of the system, there may still be 380 V DC present on the intermediate circuit.

A life-threatening hazard of electric shock exists.

PC Boards

⚠CAUTION	**The p.c. boards contain electrostatic highly sensitive components.** **If disregarded, the components could be damaged.** **Use ESD equipment, ground prior to making contact and place the components on a conductive surface.**

Metal Curtain

⚠WARNING	**The edges of the metal curtain of the stand are very sharp.** **They may cause severe injury.** **Apply the protective strips as mentioned in section "Protective strips for the metal curtain" on page 3 - 8 after removing the covers from the stand. Remove the protective strips only when the covers are to be mounted or when vertical adjustment of the swivel arm system is necessary.**

Measurements with the oscilloscope

⚠WARNING	**The existing ground conductor in the mains cable must under no circumstances be disconnected when operating the oscilloscope.** **A life-threatening hazard of electric shock exists.** **For measurements in which a resulting ground loop may falsify the measuring result, use the differential amplifier (difference measurement).**

Swivel-arm rotation

⚠WARNING	**Never rotate the swivel arm with the detector wing in the parking position. This will damage the main cable harness.**

Service Software

The MAMMOMAT *Novation*^{DR} has various service software packages:

- Acquisition Workstation
  The Acquisition Workstation service software is web-based and can be started by the Netscape icon on the desktop.
- BRICK
  The BRICK service software can be accessed via the Acquisition Workstation.

- MAMMOMAT stand.
  The Service PC is required for MAMMOMAT stand service software.

NOTE

When the generator is switched off with the service PC connected, wait approximately 5 seconds before switching it on again (The LED's H3 and H4 have to be off).

A description of the service PC syntax and DROC/BRICK service software is found in Chapter 23 "Appendix".

Delay times between exposures

The delay times listed below must be followed to prevent the tube from overheating.

Exposure mAs value	Delay time between exposures (in seconds)
max. 100	min. 15
max. 200	min. 30
max. 300	min. 45
max. 400	min. 60
max. 500	min. 75

Scope of delivery

The **MAMMOMAT *Novation*^{DR}** is normally packed in two crates and one cardboard box (the number of packages depends on the customer's choice).

The MAMMOMAT *Novation*^{DR} has an area loading of 800 kg/m^2; according to DIN 1055T3, 1000 kg/m^2 are permissible.

Crate (length: 210 cm, width: 80 cm, height: 150 cm), 360 kg plus 60 kg (pallet)

The crate contains the MAMMOMAT *Novation*^{DR} Stand.

Crate (lenght: 210 cm, width: 80 cm, height: 120 cm)

The crate contains:

- Accessories, e.g. cover panels, WorkStation, compression plates, documentation, installation material
- Radiation shield

Cardboard boxes (length: 90 cm, width: 80 cm, height: 60 cm), approximately 60 kg

This cardboard box contains the detector.

NOTE	**The detector package is temperature sensitive, from 10^o to 40^o Celsius.**

NOTE	**The detector package has to be disposed locally, after the installation.**

Unpacking the system components

As a general rule, the directional marks on the crates should be observed during transport, storage and unpacking.

The stand crate is bolted together, while the cardboard box is secured with plastic straps.

⚠CAUTION

The unpacking must be performed with due care.

There is a risk of foot injury when handling heavy parts.

Wear safety footwear.

MAMMOMAT Stand

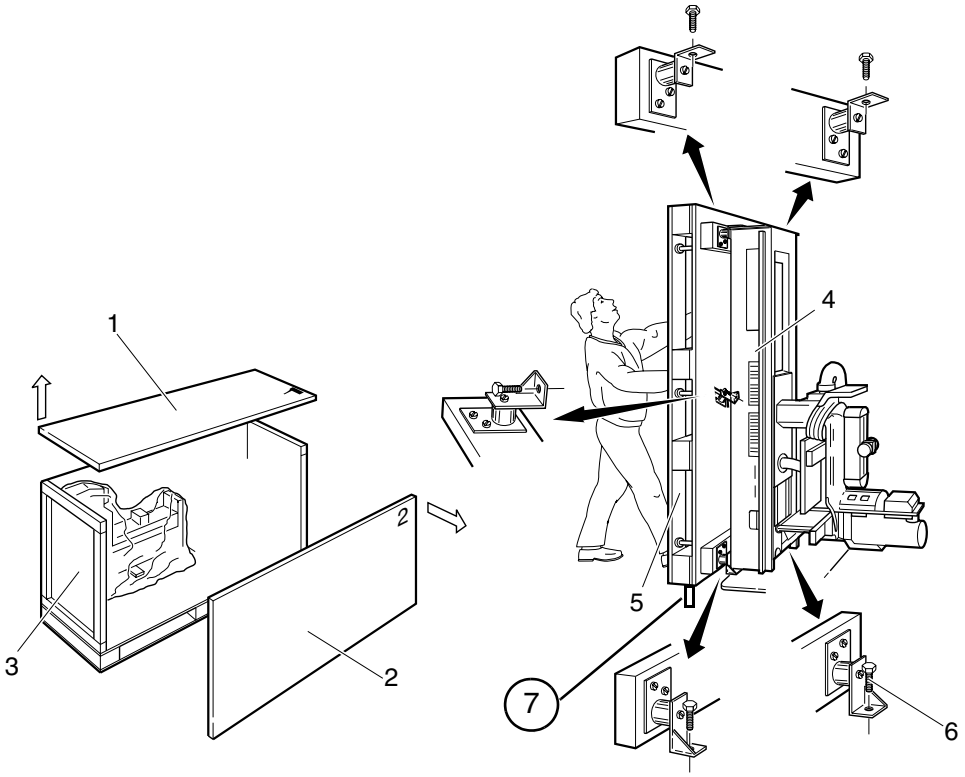


Fig. 1 Unpacking the MAMMOMAT Stand

1. Open the stand crate by removing the top (1/Fig. 1) and then the side wall (2/Fig. 1).
2. Remove the remaining walls (3/Fig. 1).
3. Remove the wooden bar (7/Fig. 1) at the bottom of the pallet.
4. Upend the stand (4/Fig. 1) with pallet (5/Fig. 1) (two persons are required).
5. Loosen the six bolts (6/Fig. 1) and remove the pallet (5/Fig. 1).

Radiation protection shield and control console

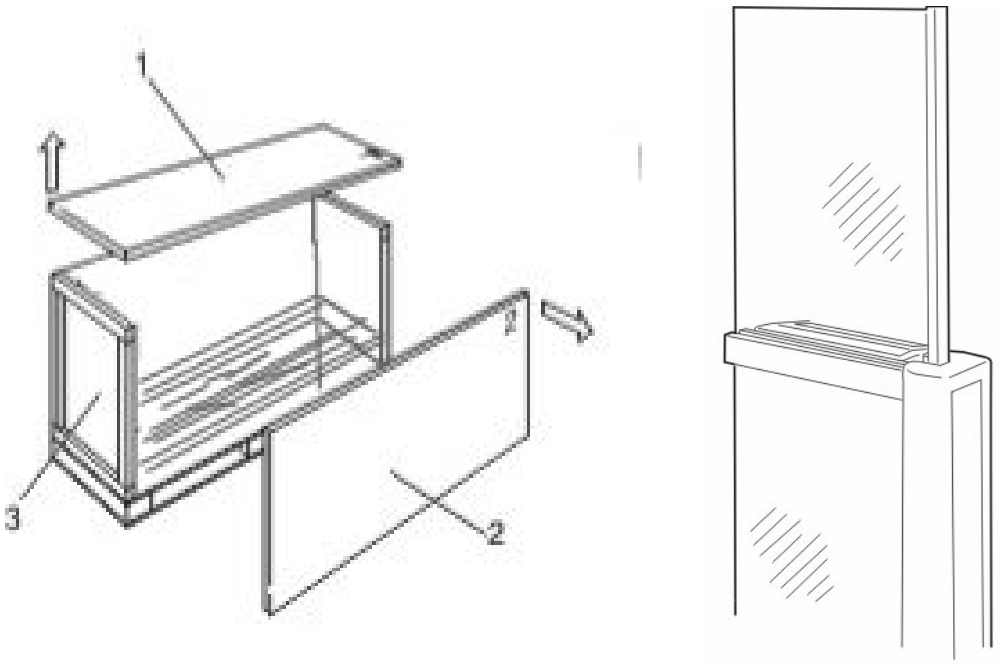


Fig. 2 Unpacking the radiation shield

1. Open the console crate by removing the top (1).
2. Lift out the lead glass (store it in a safe place), accessories, covers and installation material.
3. Remove the protective cover from the console.
4. Assemble the radiation protection shield and separate the console according to SPB7-230-031.07...

Acquisition Workstation

1. Open the cardboard boxes and lift out the computer, monitor and accessories.
2. Assemble the computer according to the user guide that is supplied with the system.

Removing the transport safeguards

Swivel arm

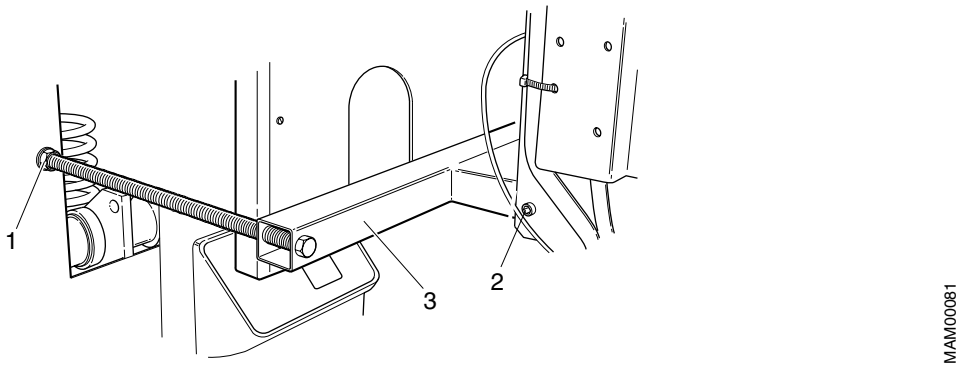


Fig. 3 Swivel arm system transport safeguard

1. Loosen the transport safeguard nuts (1/Fig. 3) and remove the tube head screws (2/Fig. 3).
2. Remove the red transport safeguard (3/Fig. 3).

Generator transport safety plates

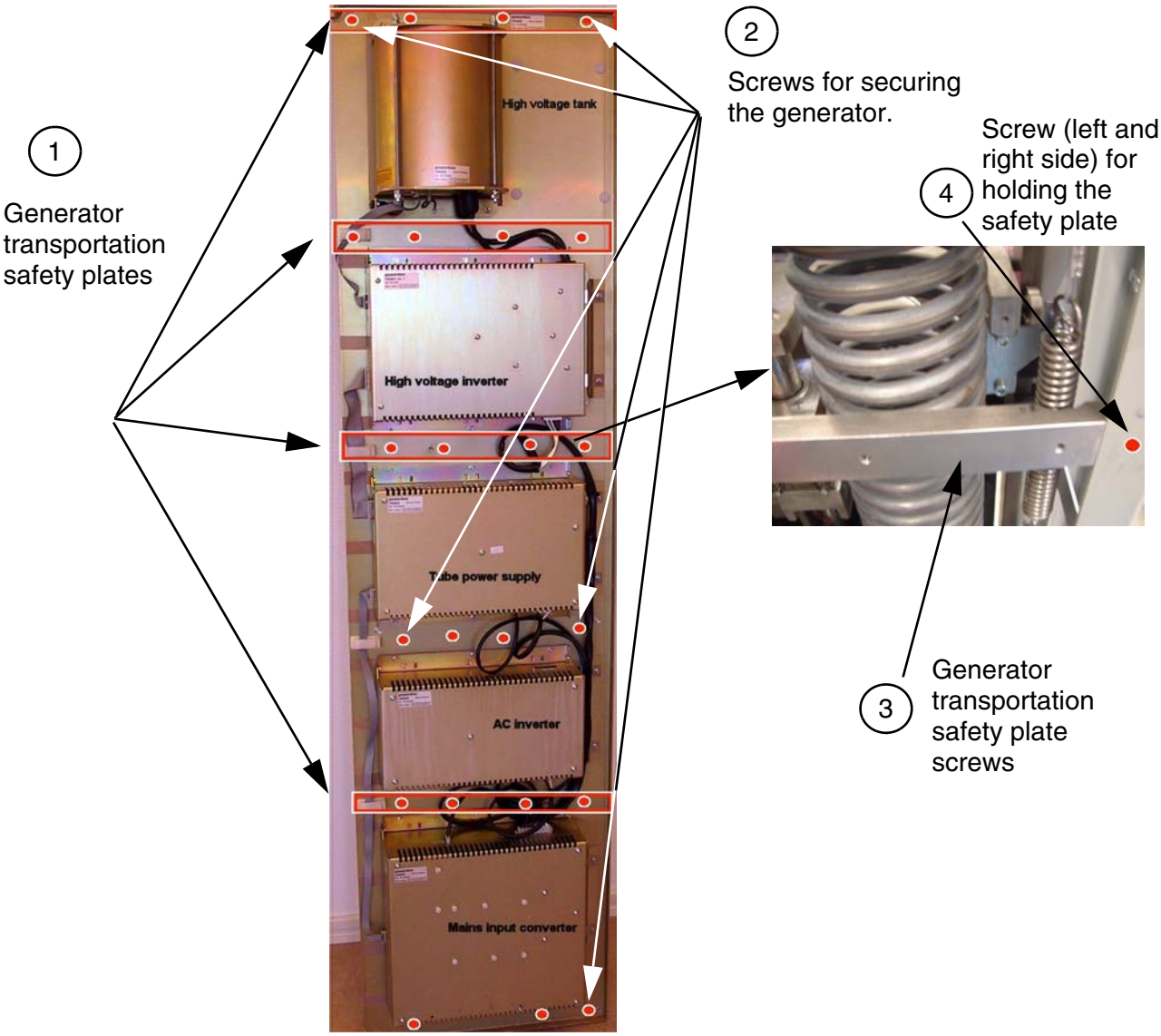


Fig. 4 Generator transport safety plates

1. To be able to access the inside of the stand, you loosen all marked screws (red dots in Fig. 4) on the generator panel.
2. Move the generator panel to the side to be able to remove the generator transportation safety plates (see No. 3/Fig. 4).
3. Remove all four generator transportation safety plates (see No. 1/Fig. 4) by removing two screws per plate (left and right, see No. 4/Fig. 4) that hold the generator transportation safety plate (see No. 4/Fig. 4).
4. Close the generator panel and insert only the specified five screws (see No. 2/Fig. 4) to secure the generator panel.

Lifting carriage

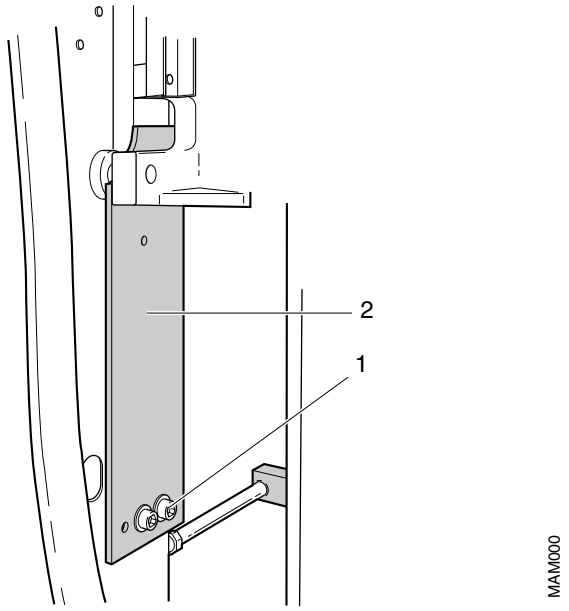


Fig. 5 Transport safeguard for the lifting carriage

1. Loosen the two screws (1/Fig. 5) and remove the red transport safeguard (2/Fig. 5). Reinsert screws (1/Fig. 5); they might be needed for service purposes.

NOTE	**The lifting carriage transport safeguard shall be kept for service purposes (Fig. 5).**

2. Cut and remove the cable tie securing the balancing spring during transport.

Rotary Motion

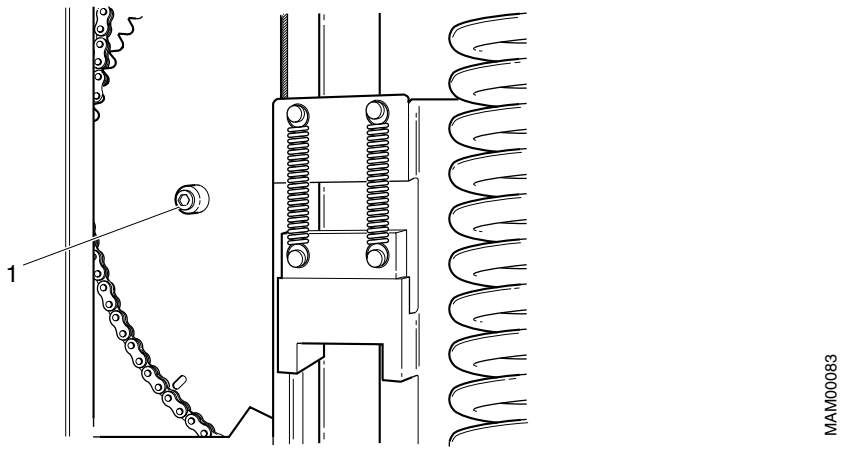


Fig. 6 Transport safeguard for the rotary motion

1. Remove the transport safeguard screw (1/Fig. 6) with spacer to enable rotary motion.

The screw and the spacer should be kept for mounting the lifting carriage transport safeguard.

2. Remove the transport safeguard on the balancing spring.

Check ball bearings

The lifting carriage is equipped with twelve ball bearings (Fig. 7). Check that all twelve ball bearings are in place and that they show no sign of damage.

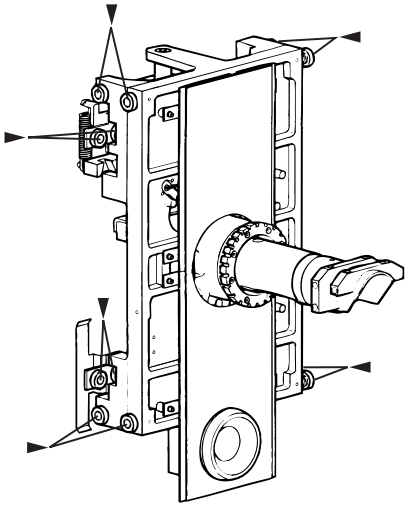


Fig. 7 Ball bearings

Protective strips for the metal curtain

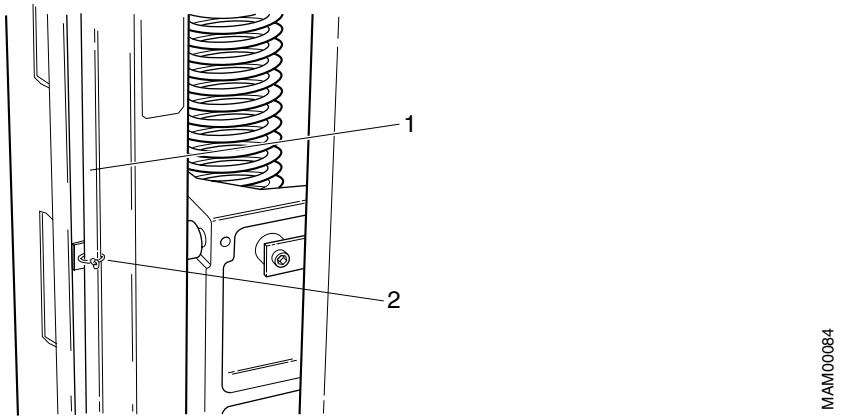


Fig. 8 Protective strips for the metal curtain

The edges of the metal curtain are very sharp and are therefore provided with protective strips (1/Fig. 8) on delivery. These strips must always be applied onto the edges of the metal curtain during service and maintenance work.

⚠CAUTION

Remove the protective strips before performing vertical adjustment of the swivel arm.

If not removed, the protective strips could be damaged.

Make sure the protective strips are removed before adjustments are carried out.

Holders (2/Fig. 8) for storing the protective strips when not in use are provided on both sides of the curtain.

Removing the BRICK transportation screws

Remove the transportation screws (1/Fig. 9).

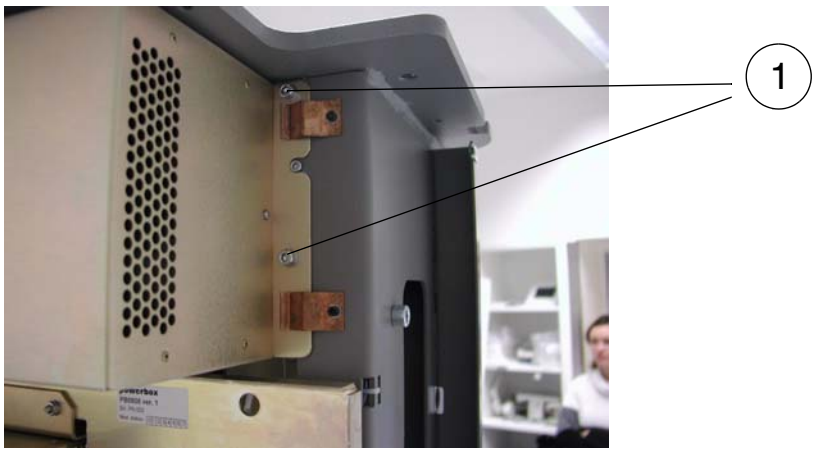
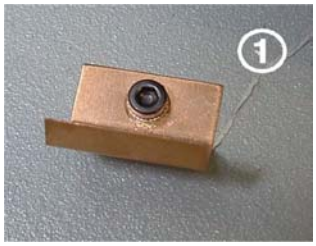
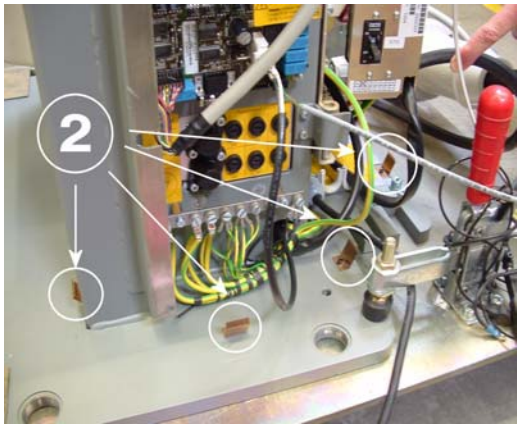


Fig. 9 Remove BRICK transportation screws

Mount the metal springs on the base plate



Metal springs to be mounted on the base plate



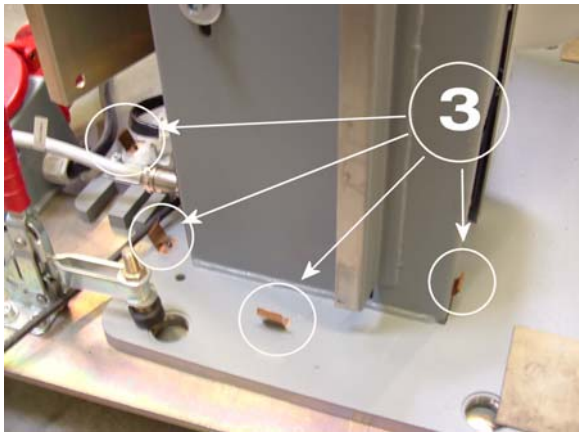
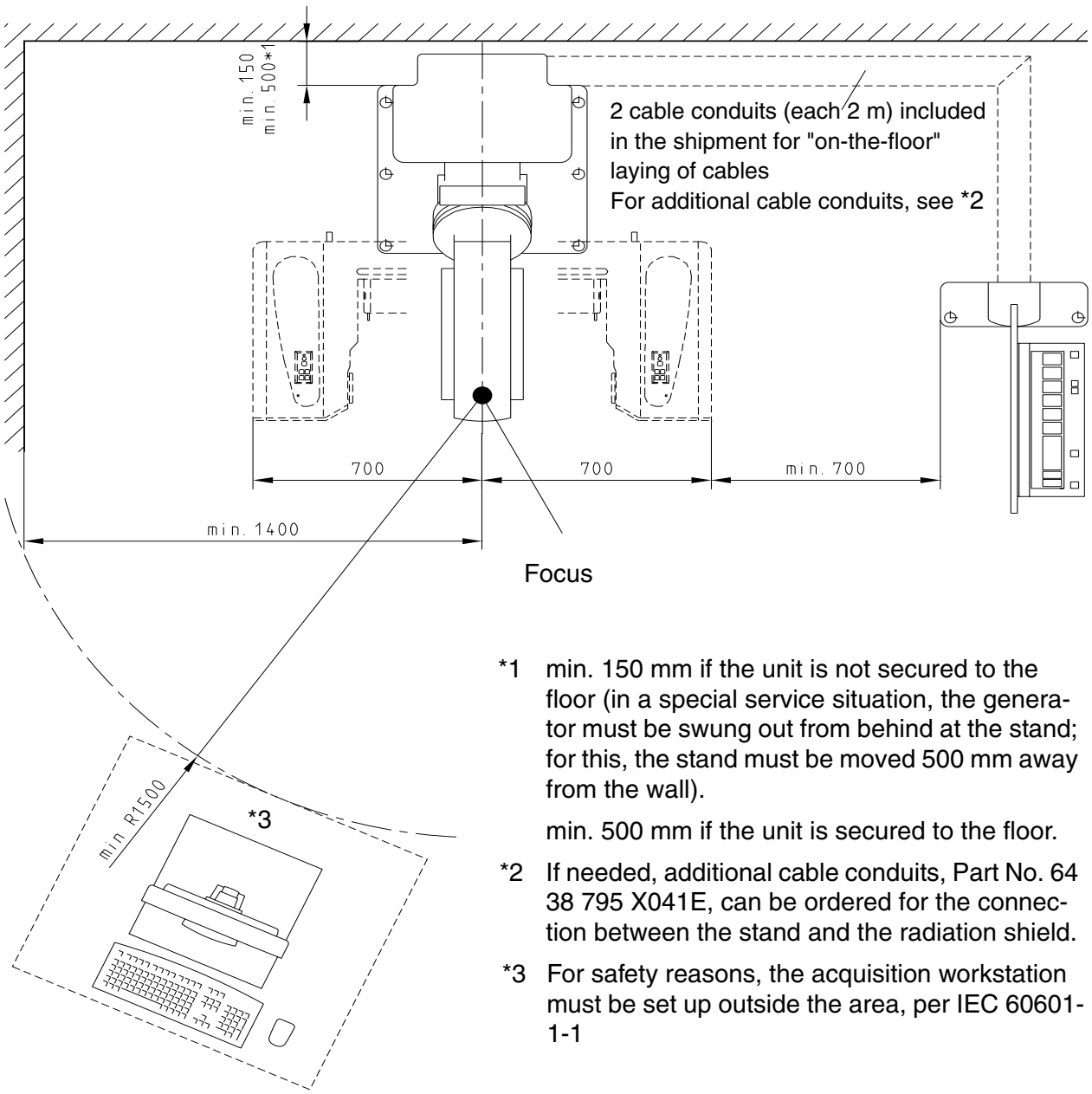


Fig. 10 Mount springs on base plate

1. Mount eight metal springs (see No. 1/Fig. 10) on the base plate (see No. 2/Fig. 10 and No. 3/Fig. 10).

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Room Planning.



*1 min. 150 mm if the unit is not secured to the floor (in a special service situation, the generator must be swung out from behind at the stand; for this, the stand must be moved 500 mm away from the wall).

min. 500 mm if the unit is secured to the floor.

*2 If needed, additional cable conduits, Part No. 64 38 795 X041E, can be ordered for the connection between the stand and the radiation shield.

*3 For safety reasons, the acquisition workstation must be set up outside the area, per IEC 60601-1-1

NOTE

The room planning example shows one possible arrangement of the units. Other arrangements are possible, provided the necessary unit distances based on the available cable lengths are maintained.

For more details on room planning, see the **Planning Guide SPB7-250-891.01.**..

Installing the cable ducts

1. Position the cable ducts (1/Fig. 1) to the stand and the radiation shield respectively.
2. Leave sufficient space, approx. 10 mm between the cable ducts (1/Fig. 1) and the base plate of the stand (2/Fig. 1) to allow for the mounting of the cable outlet cover (3/Fig. 1).
3. Check that the cable duct (1/Fig. 1) is slightly overlapped by the cable outlet cover (3/Fig. 1).

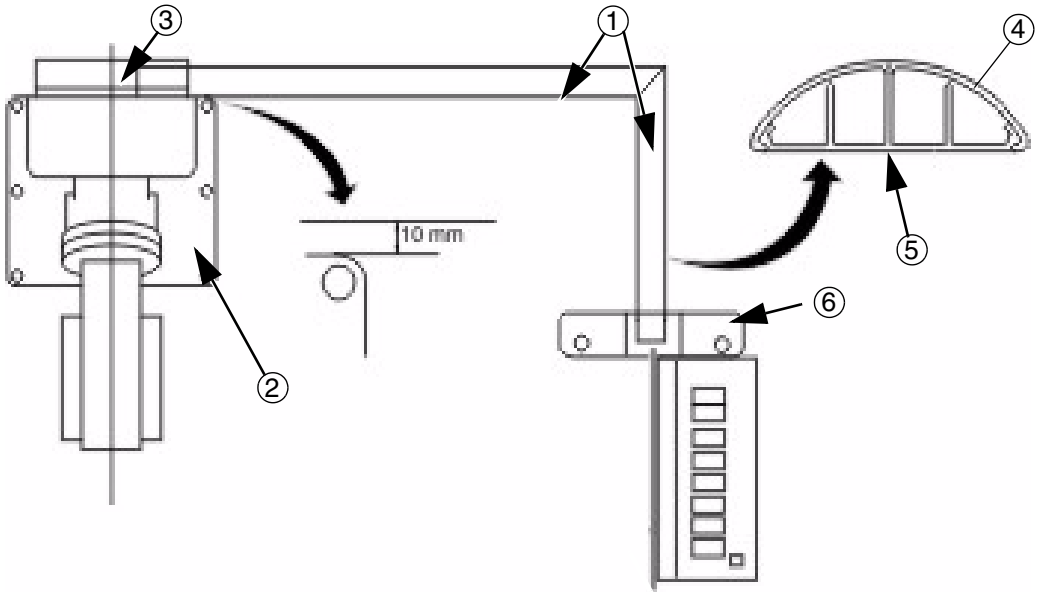


Fig. 1 Installing the cable ducts (top view)

1. Mark the outlines of the cable ducts (1/Fig. 1) on the floor.
2. Cut the bottom of the cable ducts (5/Fig. 1) and the cable duct cover (4/Fig. 1) to proper length.

NOTE

Fig. 1 shows a right-angled installation of the cable ducts.

If the console is to be installed at another angle to the stand, you just have to cut the cable ducts correspondingly.

3. Fasten the bottom plate of the cable ducts (5/Fig. 1) to the floor according to the marking using double-sided adhesive tape.
4. At the radiation shield, cover the cable entry not used with the enclosed cover plate
(6/Fig. 1).

Aligning the stand

1. Align the stand vertically by means of the levelling screws (1/Fig. 2).
   For adjustment of the levelling screws, use a ratchet spanner 1/2" with extension (without socket).

NOTE

It is important that all six screws bear against the floor.

This is to ensure optimum stability of the stand.

2. Cover the levelling screws with the cover discs supplied.

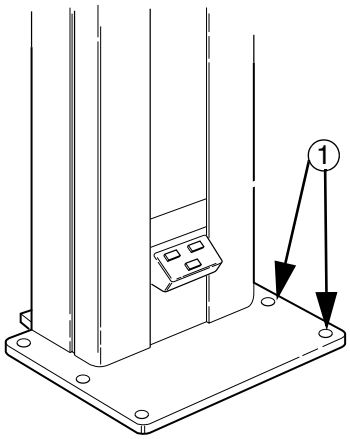


Fig. 2 Levelling screws

Free-standing radiation shield (option)

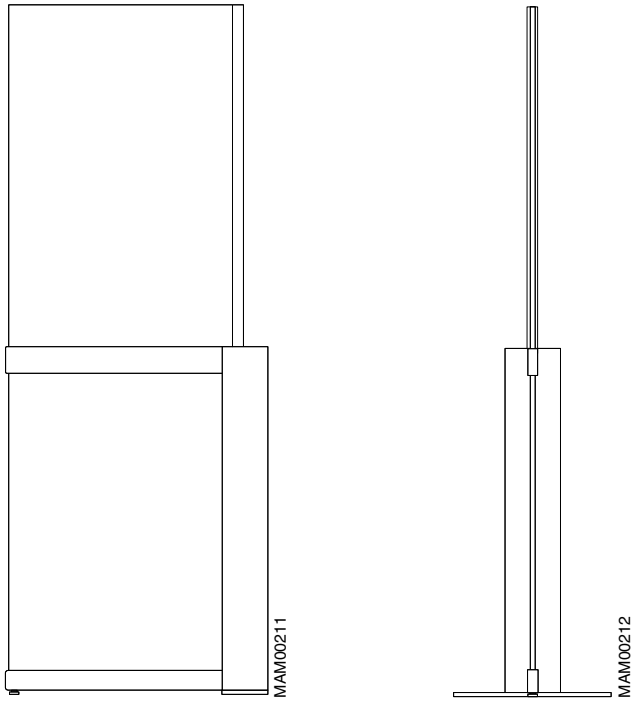


Fig. 3 Free-standing radiation shield

The free-standing radiation shield must be bolted to the floor, see separate instructions enclosed with the radiation shield (**SPB7-230.031.07...**).

Control console

The control console can be mounted

- to the radiation shield
- to the wall – horizontally or vertically as shown in Fig. 4 below
- on a table

in the examination room or in an adjacent room with radiation-proof windows. It is important that the control console is placed so that the operator has a good view of the patient from the control console.

Ensure that the control console is attached to the wall with adequate safety margins. Dowels and screws are not supplied. Please obtain these locally and ensure that they are suitable for the material used in the wall. The control console has a weight of 4 kg.

There are two cable outlets on the separate control console; one at the back and one on the underside. On delivery, the cable is led through the outlet at the back of the control console.

If the control console is mounted to the wall or radiation shield, the cable shall be led through the outlet on the underside.

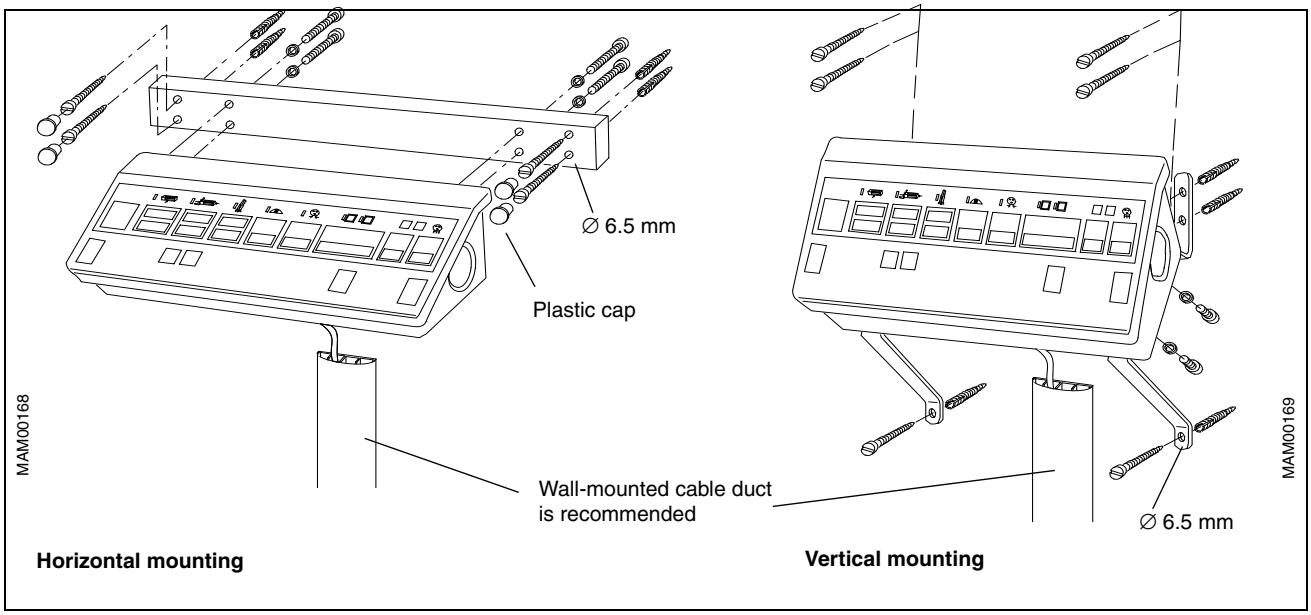


Fig. 4 Wall-mounted control console

If the control console is to be mounted on a table, the minimum/maximum length of the screws penetrating into the control console must be observed, see Fig. 5.

Fig. 6 shows how the control console is to be mounted on the free-standing radiation shield (option), see separate instructions enclosed with the radiation shield.

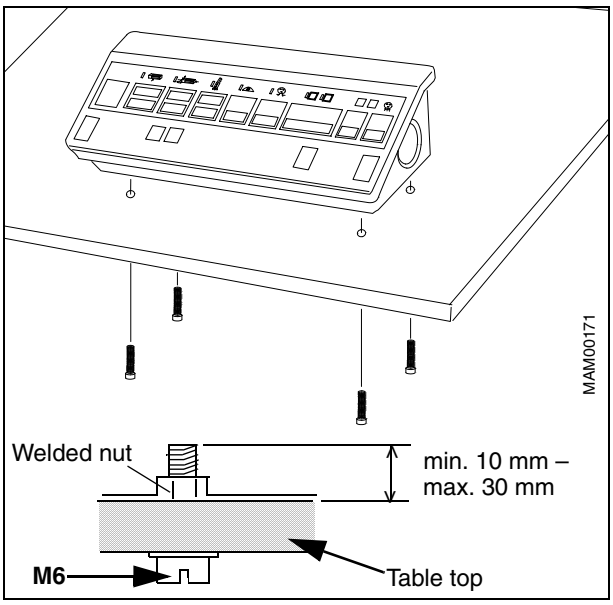


Fig. 5 Control console mounted on table

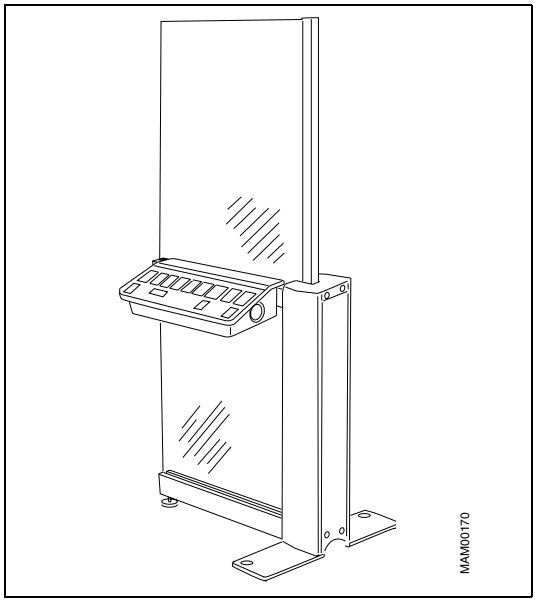


Fig. 6 Control console on free-standing radiation shield (option)

Bolting the stand/radiation shield to the floor

Should a permanent fastening to the floor be required due to local regulations (for example in areas subject to earthquakes) or due to the quality of the floor covering, the stand/radiation shield can be bolted to the floor by means of safety dowels and screws. When bolting the stand/radiation shield to the floor, the fixing screws shall pass through the hollow levelling screws (1/Fig. 7 and 1/Fig. 8).

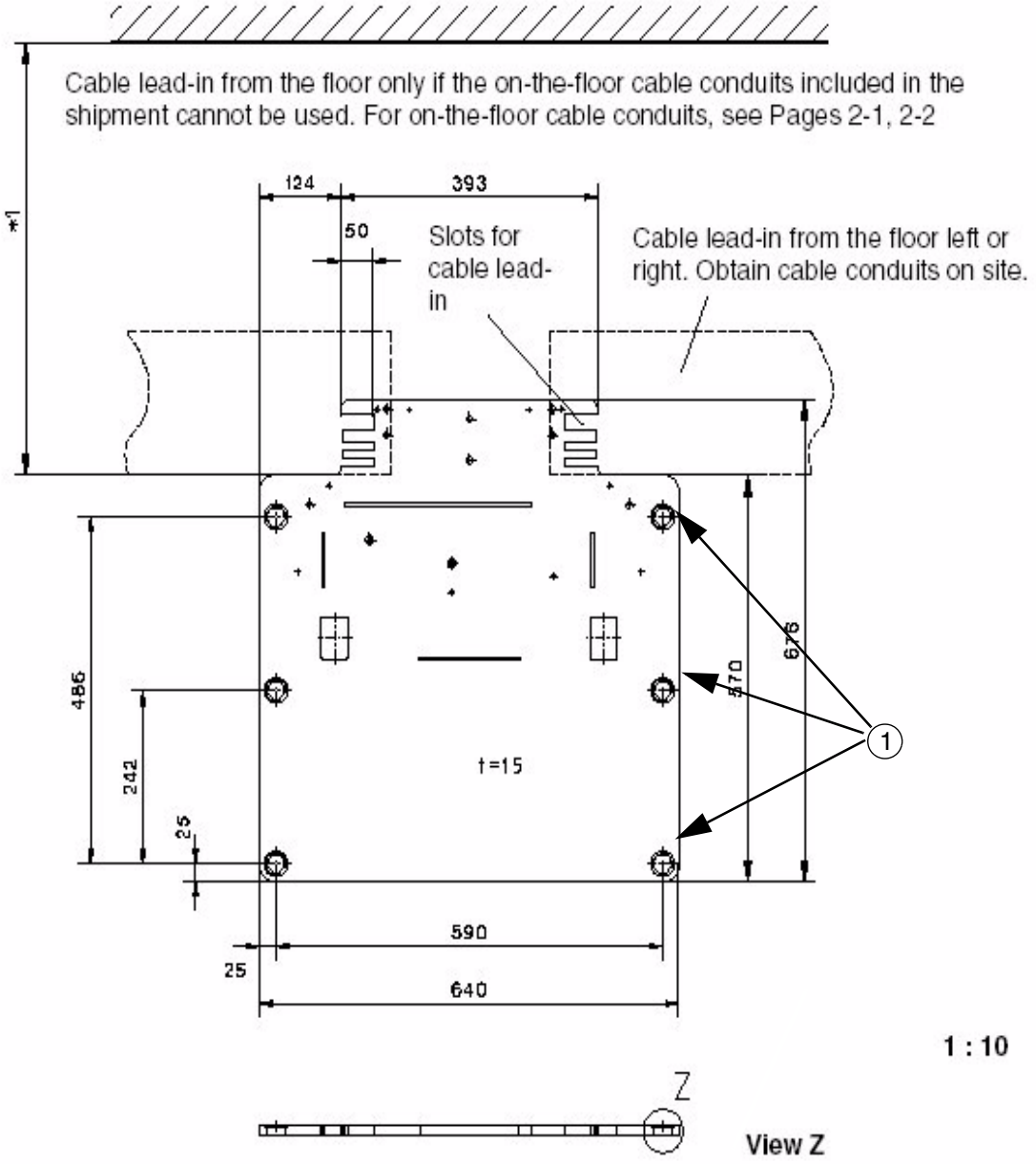


Fig. 7 Base plate for the stand

NOTE **The base plates shall be secured with at least four screws each (two on either side).**

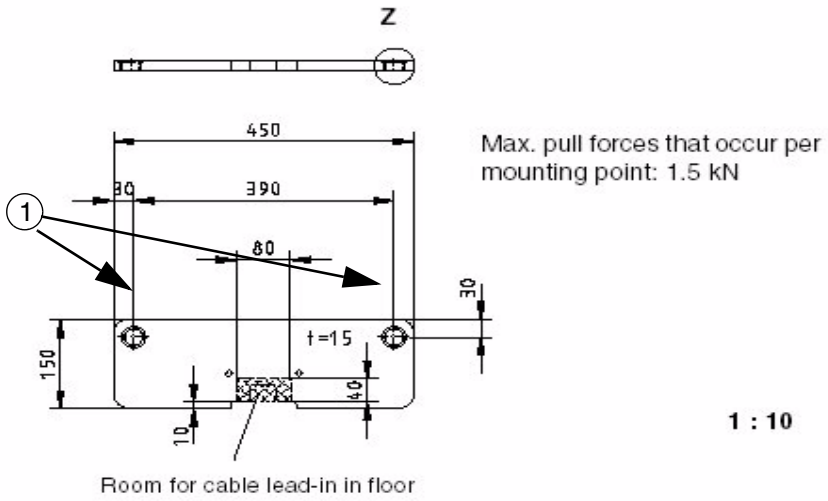


Fig. 8 Base plate for the radiation shield

1. Position the stand/radiation shield and mark out appropriate fixing holes on the floor using the base plate as a template.
2. Drill the holes and insert dowels and screws.Tighten the screws to 10 Nm.

Example of the leveling screws

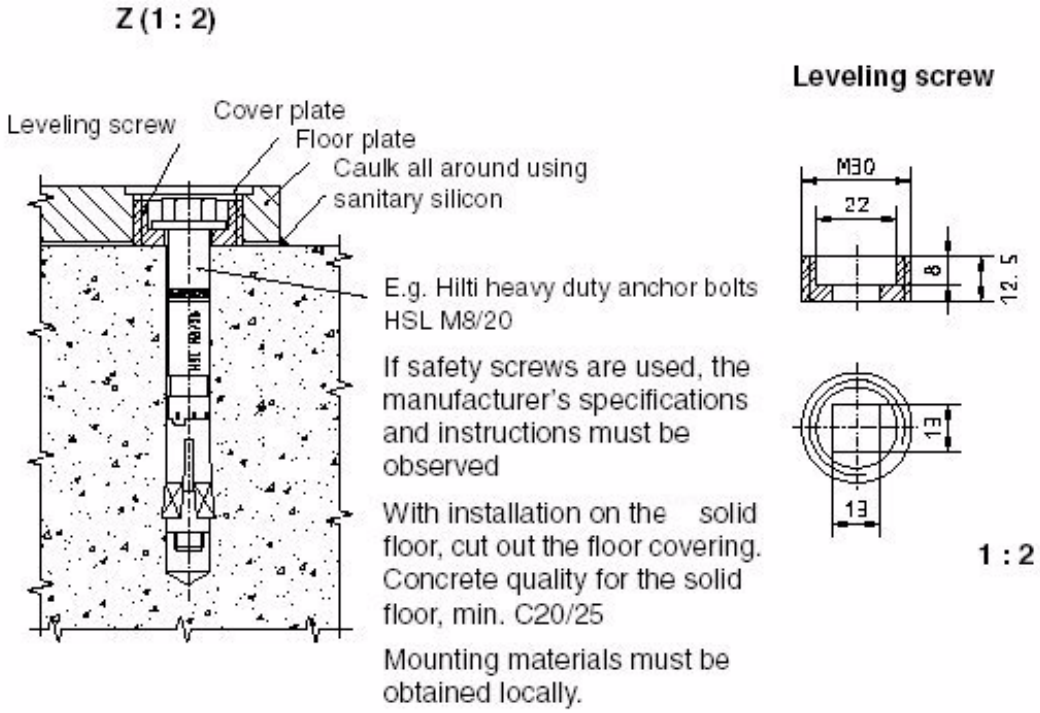


Fig. 9 Screws for the base plate

NOTE

The screws must not come in contact with any conductive materials such as reinforcing iron, since the grounding could be compromised.

Stay clear of conductive materials when fastening the screws.

Control console cable

Connect the control console cable to the bottom of the MAMMOMAT stand and to the control console.

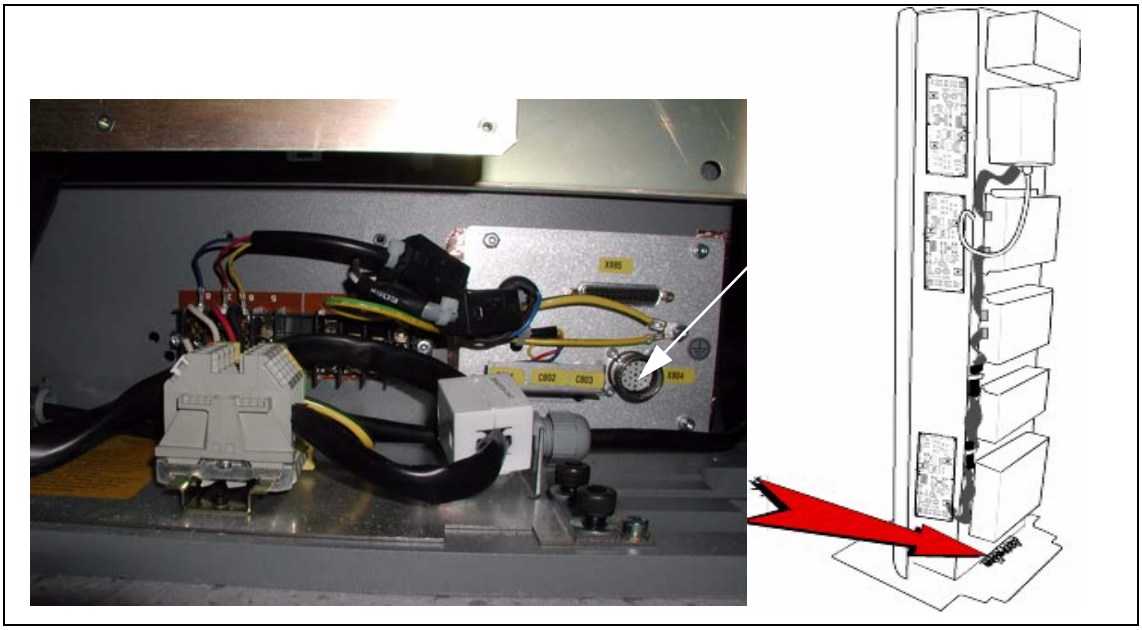


Fig. 1 Control console connection

Fibre optics cable

Handling

- Always handle fiber optic cables delicately and by the connector housing.
- Avoid acute bends in the cable, as this could break the fiber optic link inside the cable

Connecting

- Always perform one connection at a time.
- Remove the dust caps on the fiber optic connectors (you may have to rotate the cap to loosen it).
- Holding the cable by the connector housing, insert the cable connector into the connector on the device, making sure to align the keying features so the connectors are properly mated, then turn the connector clockwise to lock it.
- To disconnect the cable connector, turn it counterclockwise, then pull it from the connector on the device.

Cleaning

- Clean the connectors on both the cable and the devices with a lint-free, alcohol-dampened cloth.
- Thoroughly wipe the side and end of the ferrule.
- Blow the ferrule with compressed air, or allow it to air dry, before reconnecting the cable.
- Visually inspect the ferrule for lint.
- When not connected, replace the protective cap onto connector ends.

The interface card is PCI-bus compatible.

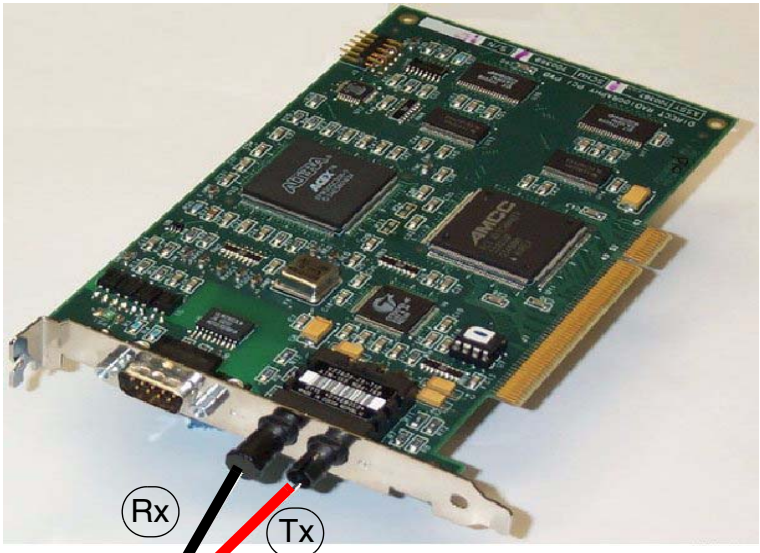


Fig. 2 PCI card connection

Fig. 2 shows the PCI interface card fiber optic connectors used for the cable that connects the BRICK to the PCI interface card.

1. Connect the fiber optics cable (1/Fig. 2) to the computer.
2. Connect the fibre optics cable (1/Fig. 3) to the BRICK in the MAMMOMAT stand.

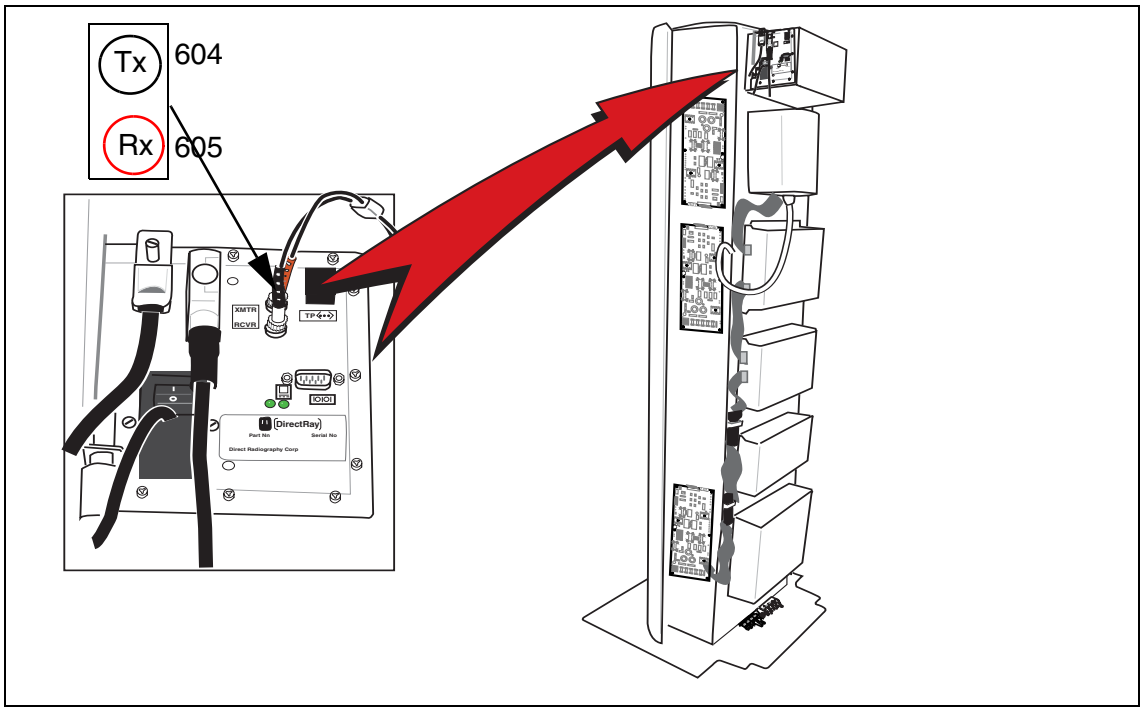


Fig. 3 BRICK connection

Radiation protection door switch

It is possible to connect a radiation protection door switch to the MAMMOMAT *Novation*^{DR} master board D750 connector X754.

NOTE	**A radiation protection door switch is not delivered with the MAMMOMAT *Novation*^{DR}.**

A 15V / 5 mA signal is used in the door switch circuit. When the signal path is opened by the door switch, the exposure will immediately be terminated.

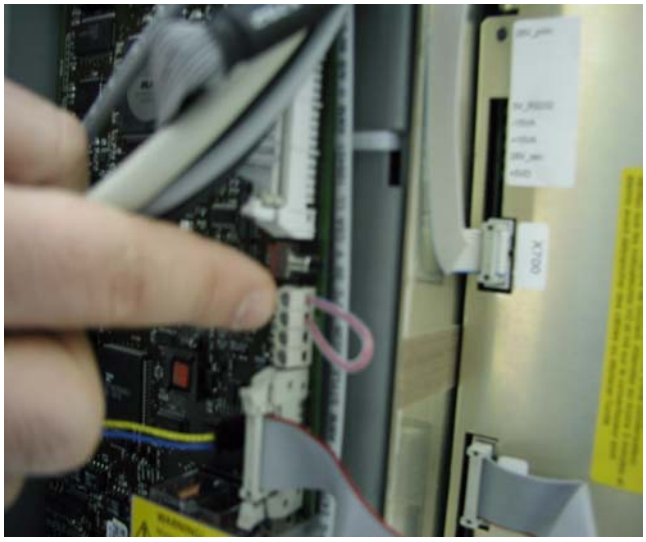


Fig. 4 Connecting the door switch

1. To connect a door switch, remove the jumper from the X754 (Pin 1,2) located on the master board D750 (see Fig. 4) and connect the door switch instead.

If a radiation protection door switch is not used, a jumper (see Fig. 4) on the master board 750 at connector X754 (Pin 1,2) has to be inserted.

External exposure lamp

This should only be performed if the customer requires it.

The connection on the master board works as a shutter. The signal from the master board is only active during exposure. Thus the exposure lamp will only be lit when the signal is active.

Connect the cable to the lamp holder in series with the power supply.

⚠CAUTION	**When connecting the exposure lamp to the master board, make sure that the electrical load does not exceed 24VAC / 25W**

1. Connect the exposure lamp to the connector X759 located on the master board D750, see Fig. 5.



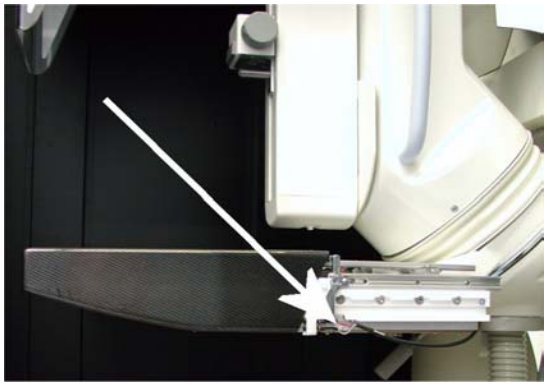
Fig. 5 Connecting the exposure lamp

NOTE	**Do not use power from the MAMMOMAT stand**

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Mains voltage connection

⚠**WARNING** **Before the power for the MAMMOMAT is turned on, make sure, that the cable plugs (to the left and right of the system) for the magnification table are not shorted.**



Electrical power to mains input

The mains input can be either 1-phase or 2-phase, 50 or 60 Hz.

Mains voltage	1-phase: 208, 230, 240 and 277 V ±10%
	or
	2-phase: 208, 230, 240, 277 and 400 V ±10%
Mains frequency:	50 or 60 Hz
Maximum load:	10kVA (momentary) and 0.8 kVA (long time load).
Fuse:	25 A (external) 208 -> 400 V.

Connections

Power system	Type of connection	Power voltage	Power connections
Single-phase	Phase to neutral	208 V-277 V	Connect to **3** and **4** (see No. 1/ Fig. 1)
Two-phase	Phase to phase	208 V-400 V phase to phase. Note: Max. 277 V phase to neutral/ ground allowed.	Connect to **3** and **4** (see No. 1/ Fig. 1). Use two phases (of three) in a normal power distribution system. The remaining wires, neutral and the third phase may be connected to terminal **1** and **2**. See Fig. 2.

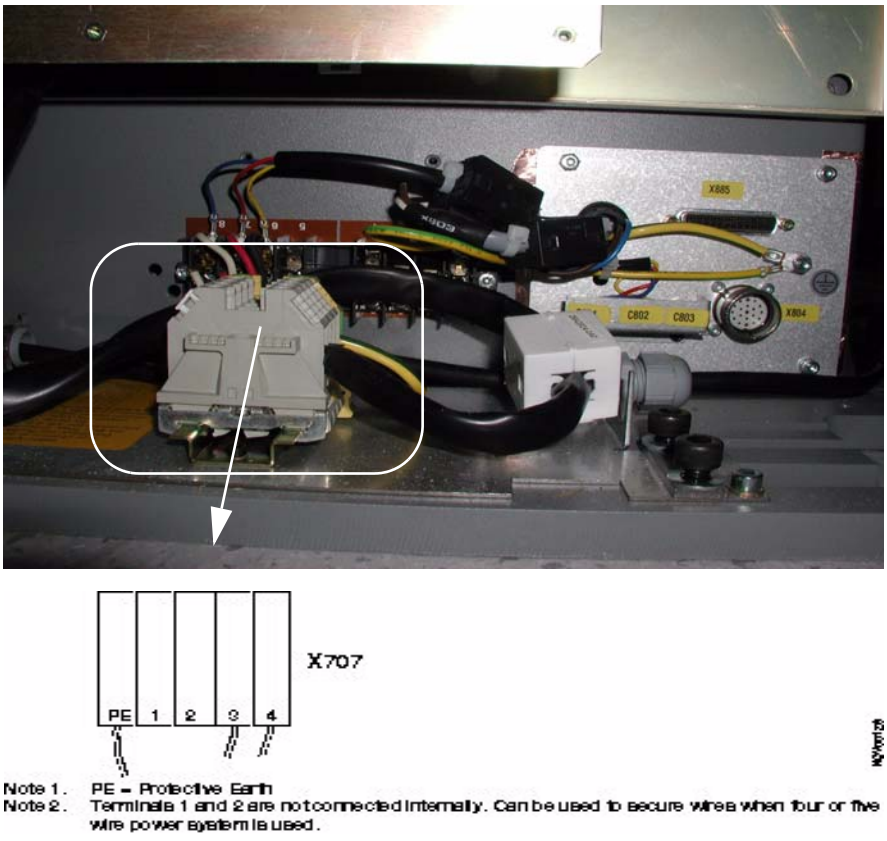


Fig. 1 Incoming mains cable

1. Connect the incoming mains cable to the mains terminal (2/Fig. 1) at the bottom of the back of the stand.
2. Relieve the strain on mains cable.

Measuring the line resistance

1. Connect the line resistance meter to the mains input terminal on the stand.
2. Mains supply **ON**.
3. Carry out measurement.
4. Mains supply **OFF**.

To achieve the maximum output, the line resistance must not exceed the following values:

Nominal Input Voltage [VAC]	Line Resistance Ri_{max} [Ω]
208	0.45
230	0.50
240	0.60
277	0.65
400 (2-phase)	0.85

Tab. 1 Measuring the line resistance

Checking the power supply voltages

The correct supply voltages +5 V, +15 V and +28 V have already been tested in the factory. Only a visual check of the function is therefore needed.

1. Switch the system **ON**.
2. Check that the following LED indicators (top to bottom) on the mains input converter (generator) are on:

LED check
28 VP
5VF
- 15V
+ 15V
28 VS
5V

Tab. 2 LED check

Start-up of the MAMMOMAT

1. Make a note of the exposure parameters.
2. Shutdown the MAMMOMAT system completely.
3. Turn the external power switch **ON**.
4. Check that the power up of the generator and the BRICK is performed properly.
5. Start the MAMMOMAT system by switching the power button **ON** on the control console.
6. Check that the MAMMOMAT system is powering up correctly.
7. Check that the BRICK/DROC communication is working properly (LEDs V2 and V3 need to be green on the BRICK).

   The PXCM includes three status LEDs:

   V1- Fiber-optic communications status. A red LED lights to indicate a lack of communication from the DROC. This may be caused by the fiber-optic lines not being connected properly or the detector being turned off.

   V2- PXCM status. A green LED flashes to indicate normal operation of the PXCM. If this LED does not light for a significant amount of time (i.e., 2 to 30 minutes), restart the system.

   V3-Power status. A green LED flashes to indicate that the PXCM is providing power to the detector.
8. Check that the operating mode **dr** is displayed on the control console.
9. Check if the noted exposure parameters are restored correctly.

Arranging the swivel arm

⚠WARNING	**Never rotate the swivel arm with the detector wing in the parking position. This will damage the main cable harness.**

1. Remove the protective strips from the metal curtain.
2. Run the lifting carriage upwards.
3. Attach the protective strips back onto the metal curtain.
4. Rotate the swivel arm system to **0 degrees** by pressing one of the switches for clockwise rotation on the supporting arm.
5. Unlock the wing with a screwdriver (the lever is not mounted) and move the film wing to the parking position.
6. System and mains **OFF**.

Unpacking detector

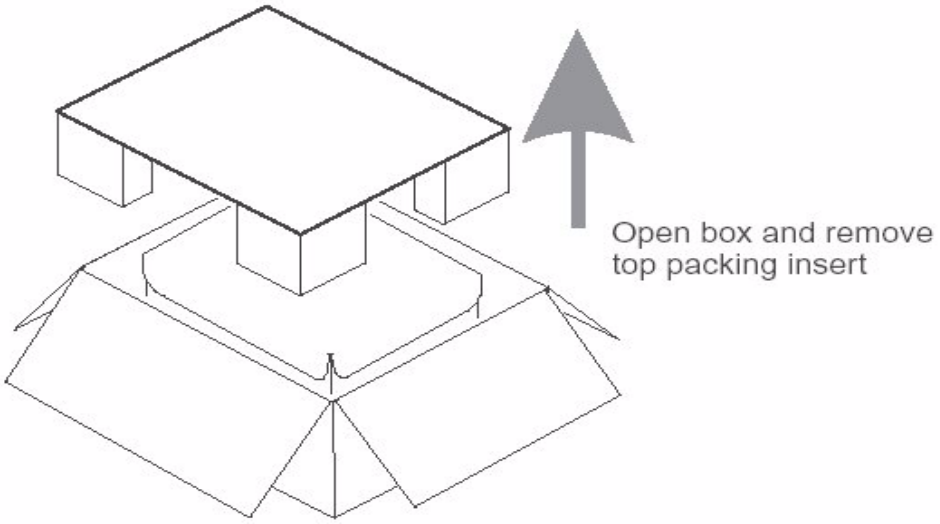


Fig. 1 Opening the cardboard box

1. Open the cardboard boxes and remove the top packing insert.

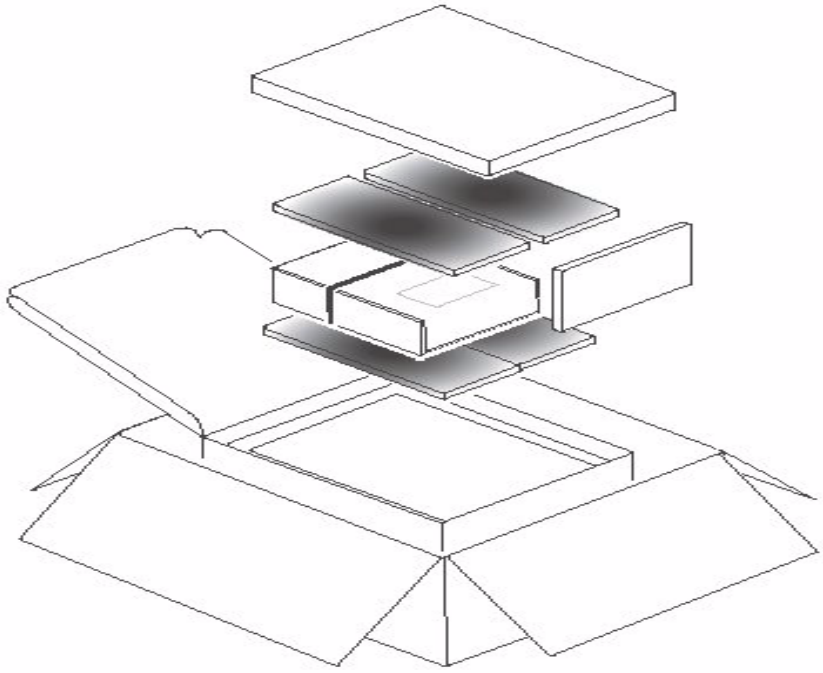


Fig. 2 Opening the box

1. Remove all of the other packing material covering the inner box in which the detector is located.

NOTE	**Do not cut the lifting band.**



Fig. 3 Lift out the inner box

1. Lift the inner box from the large box by pulling up on the lifting band.

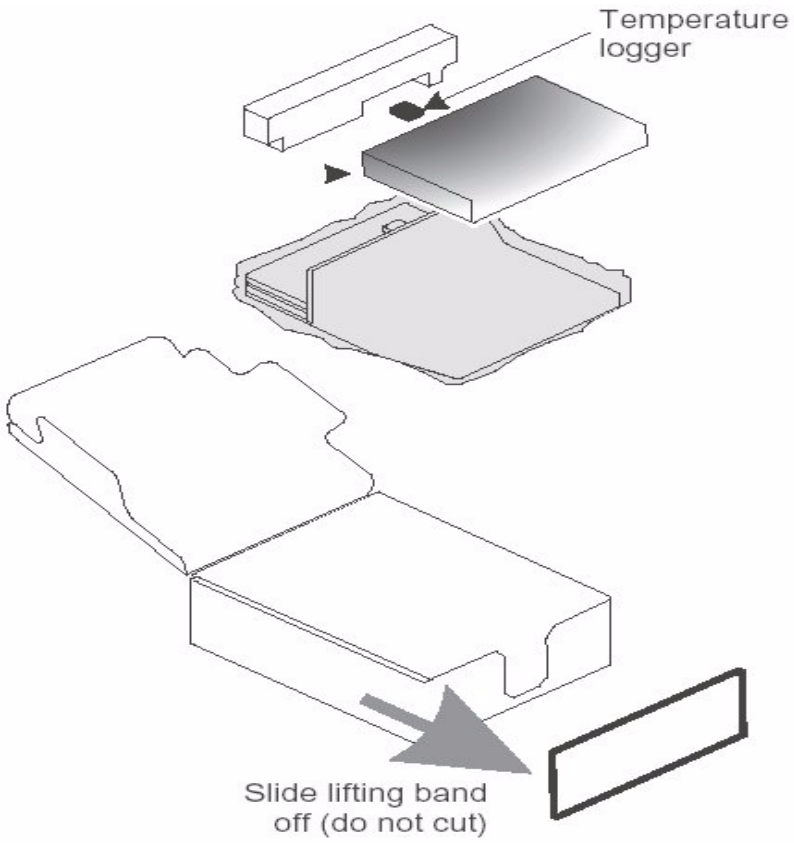


Fig. 4 Remove packing material

1. Slide the lifting band from the inner box.
2. Lift out the detector and carefully remove from wrapper.
3. Open box and remove packing insert, temperature logger and phase change material.
4. Remove the packing material inside the inner box, which includes the temperature logger that is used to ensure that the detector maintained the proper temperature while being shipped and stored.
5. Carefully remove the detector from its protective bag.

⚠CAUTION

Handle the detector with extreme care!

Avoid touching the thin film top cover that protects the imaging area. The imaging electronics under the front cover are extremely sensitive. The actual image area starts at the front edge and is approximately 25 mm inside the other three edges.

Any dust or fingerprints in this area may affect final image quality. Temperature extremes may cause permanent damage.

6. Check the temperature logger using a ballpoint pen as shown in Fig. 5.



Fig. 5 Check temperature logger.

NOTE

When the LED lights green, transportation was OK and the detector can be installed.
When the LED lights red, the detector is defective and has to be replaced.

NOTE

You have to send the temperature logger to the factory, using the regular Customer Services return process.

You will find all documents required for sending it enclosed in the detector package (black box).

Enter the detector serial number, your district address and the installation date before you send it.

Mounting the detector

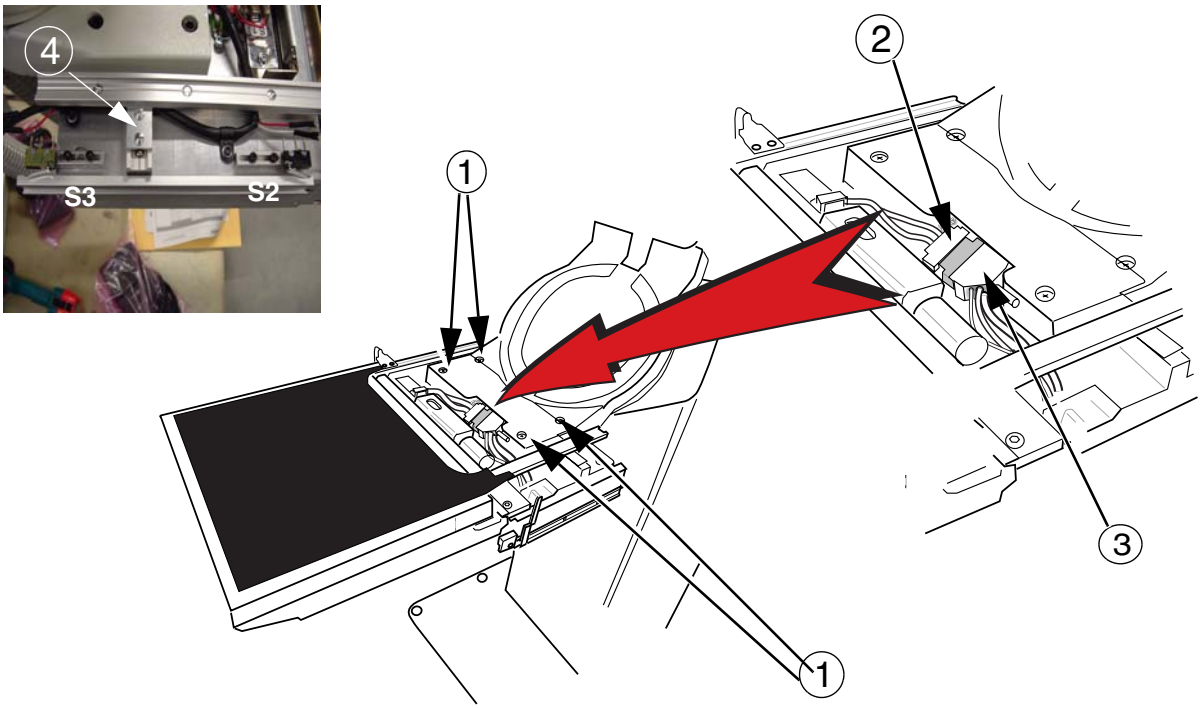


Fig. 6 Detector installation

1. Remove the micro switches and their holders S2 and S3.
2. Remove the cover from the detector cable connector.
3. Attach the detector with the four bolts (1/Fig. 6). Make sure that the bolts are tightened.

NOTE

To be sure that the detector is correctly mounted and that it is located directly below the radiation field, use the guiding lines on the wing and make sure that the detector is in the right position before screwing the bolts.

4. Loosen the grid holder, 2 screws (4/Fig. 6), and insert the detector cable underneath it. Tighten the grid holder screws again.
5. Connect the detector cable (2/Fig. 6) to the cable coming out of the wing (3 /Fig. 6).
6. Mount the cover over the detector cable with 2 screws. Make sure that no cables are squeezed.

Mounting the grid

The materials needed for the grid installation can be found in the installation material box.

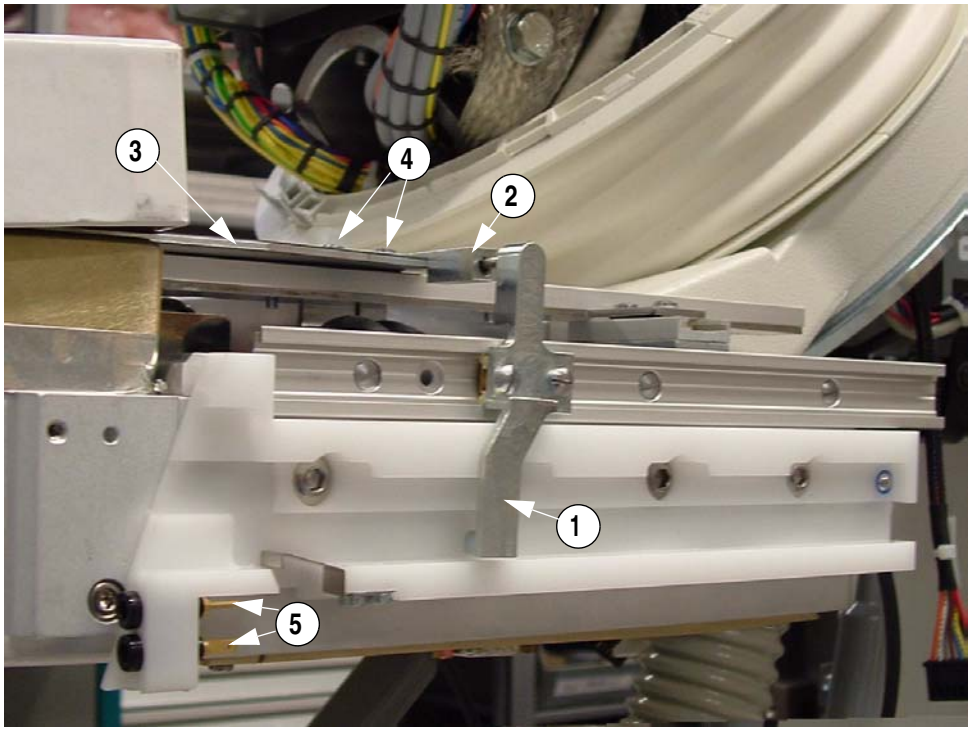


Fig. 7 Grid installation

1. Insert the left and right grid slider (1/Fig. 7) from the back into the rail.
2. Insert the left and right grid holder into the grid slider (2/Fig. 7).
3. Line up the grid to the front of the table. The front switch has to be engaged. Screw the grid (3/Fig. 7) to the grid holder (4/Fig. 7). The marking has to be on top, and the text must be readable.
4. Connect the cables (5/Fig. 7) for the magnification table, according to the labels, on both sides.

NOTE **Make sure that the cables are connected according to the labels, otherwise the D805 will burn up.**

5. Mount the bottom wing cover with 6 screws.
6. Mount the top wing cover with 4 screws.
7. Slide the detector fiber cover carefully over the detector and fasten it with 6 screws at the bottom of the cover.

Adjusting the switches

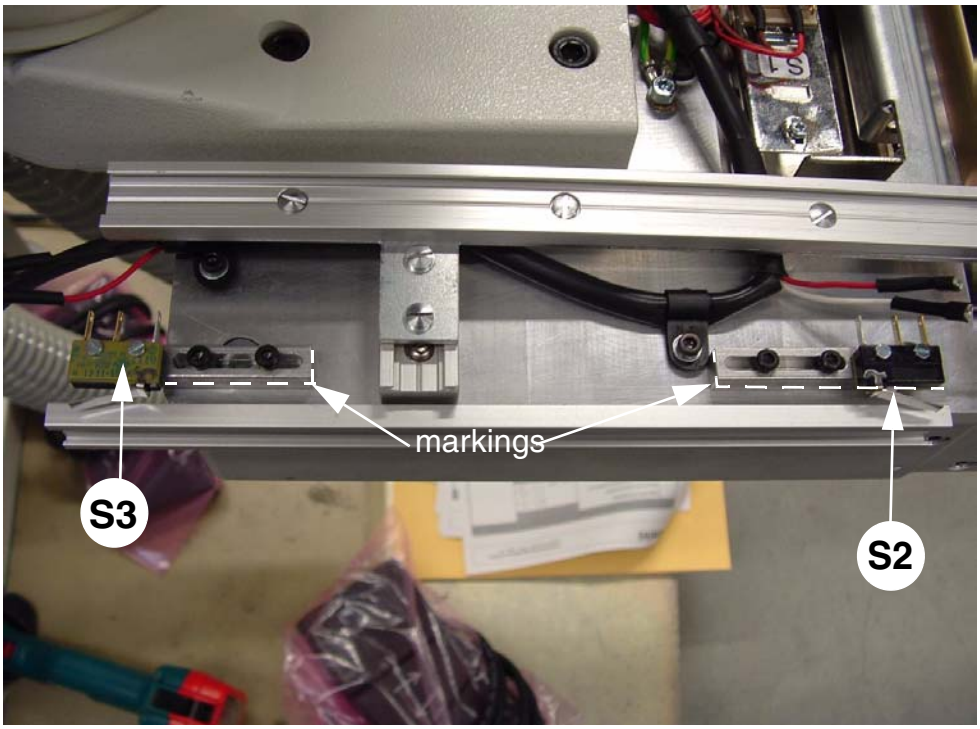


Fig. 8 Micro switch installation

1. Mount the micro switches S2 and S3 (Fig. 8) along the markings.
2. Adjustment of S2
   Move the grid to the front. S2 must switch 2 mm (+1 mm tolerance) before the grid reaches the end position.
3. Adjustment of S3
   Move the grid to the back and insert the magnification table. S3 must switch 2 mm (+1 mm tolerance) before the magnification table reaches the end position.

NOTE

The magnification table is optional. When no magnification is supplied with the system, the micro switch has to be mounted along the markings.
Remember to check the switch adjustment if the customer orders a magnification table.

Installing the swivel arm covers

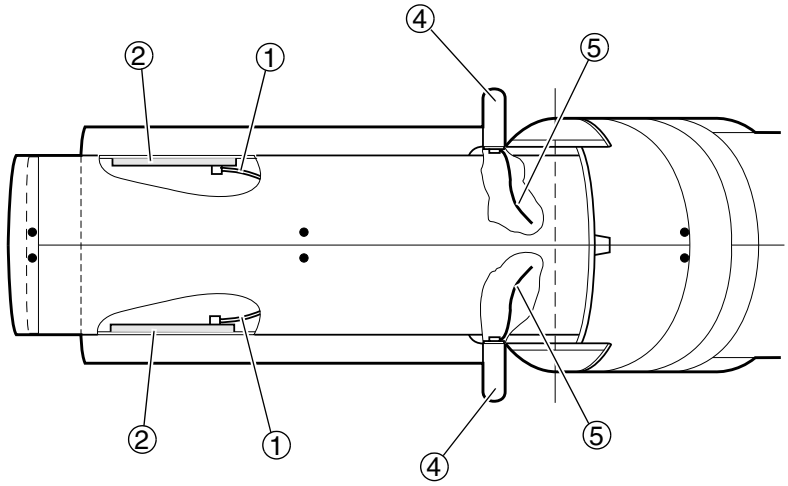


Fig. 9 Connecting the cables

Before installing the side covers, the cables have to be connected.

1. Connect cables X807 (1/Fig. 9) to control button circuit boards D807 (2/Fig. 9).
2. Connect ground wires (3/Fig. 9) to patient handles (4/Fig. 9).

Attaching the side covers

Screws in different sizes are included in the delivery.

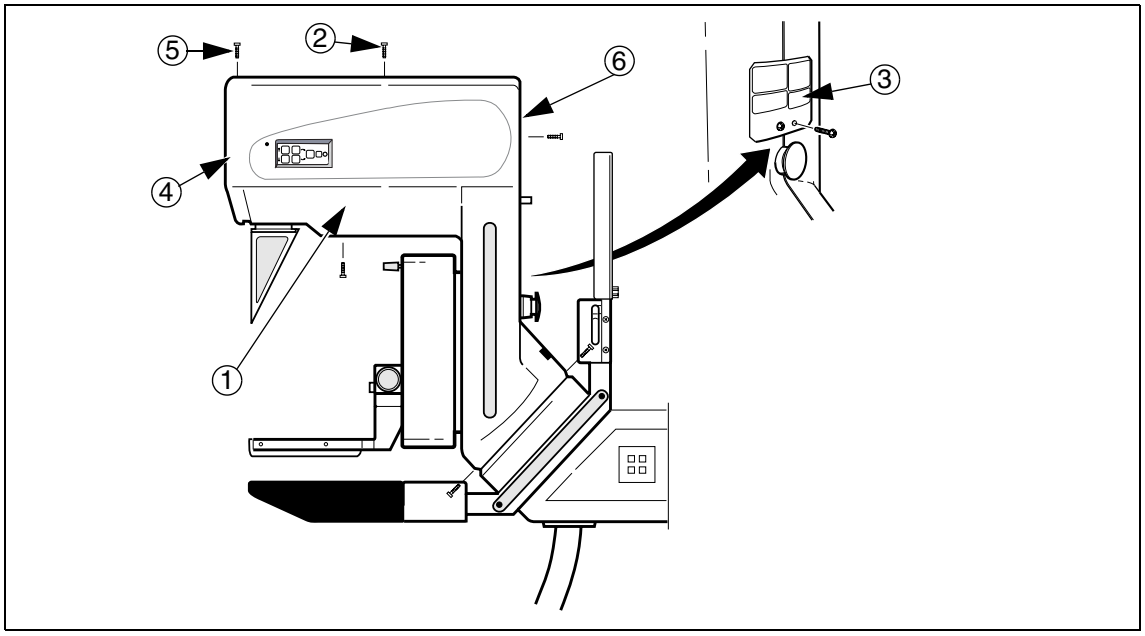


Fig. 10 Covers and sign

1. Mount the side covers (1/Fig. 10) with six screws (2/Fig. 10) on each side. Start with the right side.

NOTE	**Do not forget to fit the sign (3/Fig. 10) when mounting the side covers. Use the two longer screws.**

NOTE	**Make sure that the longer screws are not used at the back of the covers at the upper location (6/Fig. 10) since this may damage the board underneath the cover.**

Attaching the front cover

⚠CAUTION	**Risk of damage.** **If the covers are exposed to internal stress, cracks may arise.** **The following work must be carried out with caution.**

1. The side covers must be flush at the front. If necessary, loosen the screws and adjust the side covers.
2. Carefully fit the front cover (4/Fig. 10) so that both openings engage with the lugs of the side covers.
3. Carefully swing the front cover upwards and let it snap in position over the side covers.

⚠CAUTION	**The front cover must not press against the collimator.** **Risk of damage.** **Be careful while attaching the front cover.**

4. Fasten the front cover to the side covers with two short screws (5/Fig. 10).

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Checking the microprocessors LED's 8 - 1

The following LED's on the processor p.c. boards (D750) indicate whether the relevant microprocessors are operating correctly.

1. Mains **ON**.
2. Check that the CPU IC107 status LEDs D13, D14, D15 are continuously **ON** and that LED D16 is **OFF** for approximately 1 second after the mains is switched on.
3. Switch the MAMMOMAT *Novation*^{DR} system power **ON** by pressing the **ON** button on the control console. After approximately 5 seconds, check that the CPU IC107 status LED D13 is flashing rapidly and the LEDs D14, D15 and D16 are **OFF**.

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Tube high voltage, current and mAs values

This section describes how to check the X-ray tube in regard to:

- High voltage, tube current, mAs value with and without AEC and with a small or large focus.

Preparation

- Switch the system **OFF**.
- Connect the oscilloscope as follows:

  Channel 1 to measuring point **HV_ACT** **(actual value)** (1 V= 5 kV) on the D750.

  Channel 2 to measuring point **MA_ACT** **(actual value)** (1 V= 40 mA) on the D750.
- Connect the service PC to the stand.
- Start the Service Program and check in the **anode menu** that the tungsten anode is **enabled**.
- Switch the system **ON**.
- Set the "cassette loaded" switch to **OFF** via the service program:
  In the **Main menu** choose **Configuration ⇨Miscellaneous ⇨Cassette loaded check**.

Measurement method

- The mAs value must be calculated as the product of the tube current and exposure time. The tube current and the exposure time can be obtained from the oscillograms. The diagram may have glitches. In this case you have to measure the exposure time t_1 and t_2.

Example:

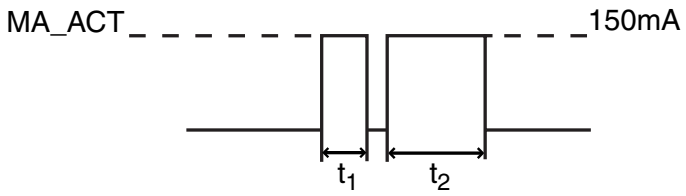


Fig. 1 Check X-ray tube high voltage, current and mAs values

In Fig. 1 the tube current is 150mA and the exposure time is t_1+t_2 in seconds. The mAs is $150mA*(t_1+t_2)$.

NOTE

Make sure, that you measure all pulses, and make sure, that the measurement device does not automatically perform a reset within the measurement.

With AEC measurements, make sure that also the AEC pre-shot pulse gets added to measurement.

Oscilloscope diagram examples

30kV, 20mAs, Mo/Mo

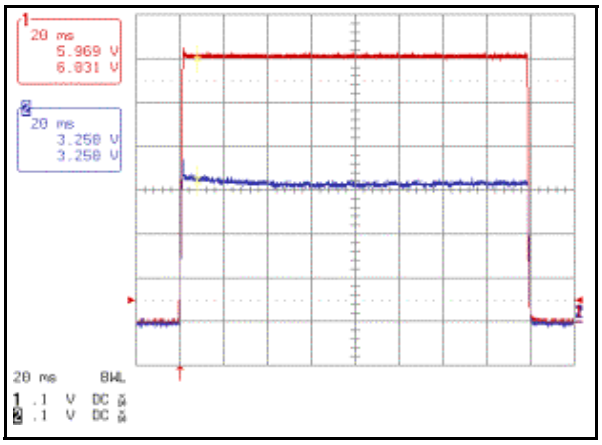


Fig. 2

30kV, 20mAs, W/Rh

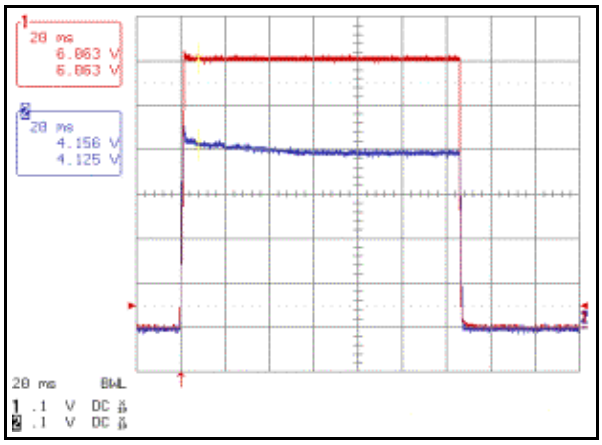


Fig. 3

30 kV	1 V/T (1 T <=> 5 kV)		30 kV	1 V/T (1 T <=> 5 kV)
130 mA	1 V/T (1 T <=> 40 mA)		166 mA	1 V/T (1 T <=> 40 mA)
160 ms	20 ms/T		128 ms	20 ms/T

35kV, 100mAs, Mo/Mo

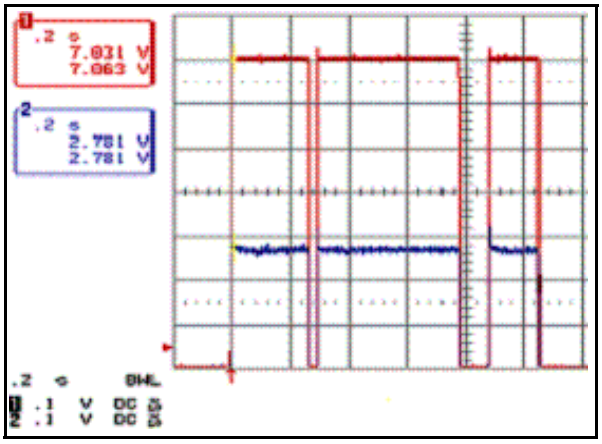


Fig. 4

35kV, 100mAs, W/Rh

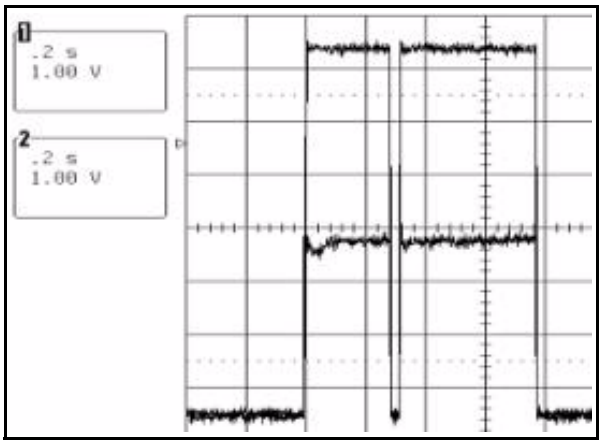


Fig. 5

35 kV	1 V/T (1 T <=> 5 kV)	35 kV	1 V/T (1 T <=> 5 kV)
112 mA	1 V/T (1 T <=> 40 mA)	132 mA	1 V/T (1 T <=> 40 mA)
0.9 s	0.2 s/T	0.72 s	0.2 s/T

Checks with a large focus and without AEC

Prerequisites

- Deselect **D** and **H** on the control console. The MAMMOMAT is in mAs mode without AEC.
- Make sure the magnification table is removed so that a large focus is selected.
- The check has to be performed for each measurement of the table.

Measurement	kV	mAs	Anode/Filter
1	30	20	Mo/Mo
2	30	20	W/Rh
3	35	100	Mo/Mo
4	35	100	W/Rh
5	25	100	Mo/Mo
6	25	100	W/Rh

- Cover the detector with the large steel plate or with a lead apron.

Test performance

1. Adjust the exposure value on the control console according to the table above.
2. Start an exposure.
3. Check and measure the kV value and the tube current characteristic on the oscilloscope.
   The accuracy of the kV is ±5%, for the tube current ±10% and for the mAs product ±10%.
4. Record the measured kV and mAs value in the **Installation Protocol,** (SPB7-250.813.01...) **.**
5. Change the setting and continue with the next measurement until you have completed all measurements from the table above.

Checks with a small focus and without AEC

NOTE	**The magnification table is only shipped with the system if the customer has ordered this option.**

Prerequisites

- Make sure the magnification table is mounted so that a small focus is selected.
- Deselect **D** and **H** on the control console. The MAMMOMAT is in mAs mode without AEC.
- The check has to be performed for each measurement of the table.

Measurement	kV	mAs	Anode/Filter
1	30	10	Mo/Mo
2	30	10	W/Rh

- Cover the detector with the large steel plate or with a lead apron.

Test performance

1. Adjust the exposure value on the control console according to the table above.
2. Start an exposure.
3. Check and measure the kV value and the tube current characteristic on the oscilloscope.
   The accuracy of the kV is ±5%, for the tube current ±10% and for the mAs product ±10%.
4. Record the measured kV and mAs value in the **Installation Protocol,** (SPB7-250.813.01...) **.**
5. Change the setting and continue with the next measurement until you have completed all measurements from the table above.

Checks with a large focus and with AEC

NOTE	**Measurements in AEC mode shall be performed after calibrating and adjusting the AEC.**

Prerequisites

- Remove the lead apron from the detector.
- Mount the collimator mounted plexi phantom.
- Register a patient. (See Chapter 19 "Startup of DROC" and the Users Instructions for more details).
- Make sure the magnification table is removed so that a large focus is selected.
- Select **H** on the control console. The MAMMOMAT is now in AEC mode.
- The check has to be performed for each measurement of the table.

Measurement	kV	mAs	Anode/Filter
1	25	-	Mo/Mo
2	25	-	W/Rh

Test performance

1. Adjust the exposure value on the control console according to the table above.
2. Start an exposure.
3. Check and measure the kV value and the tube current characteristic on the oscilloscope.
   The accuracy of the kV is ±5%, for the tube current ±10% and for the mAs product ±10%.
4. Record the measured kV and mAs value in the **Installation Protocol,** (SPB7-250.813.01...) **.**
5. Change the setting and continue with the next measurement until you have completed all measurements from the table above.

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Automatic collimator

The automatic collimator unit limits the radiation/illumination field on the object table (detector) depending on the combination of the object table, compression paddle and focus.

At startup or reset, a self-test is carried out to check that the collimator lamellae are moving in both directions, from their outer end positions (from now on called the reference position(s)) into and passing the positions for maximum collimation.

After the self-test has passed, collimation is carried out according to the combination of object table and compression paddle. During standby the collimation is always made to the focus of the field light bulb, i.e. to get the illumination field. This field will correspond to the radiation field during the exposure. When the exposure preparation is started, the collimator lamellae are adjusted to the currently selected anode focus, i.e. to get the radiation field.

Exposure will not be allowed as long as collimation is not ready or an invalid object table and compression paddle combination has been selected.

The maximum time to change the size of the field is 7s in standby and 1.9s when the initiation of the exposure preparation has been received. If the maximum time is elapsed, error 816 is generated.

NOTE	**The calibration procedure has to be performed for the detector wing only.**

Collimator reference axis

Collimator calibration is used to get the offset values for two reference axes, **y** and **x**.

- The **y-axis** is orthogonal to the chest wall side edge in the center of the object table.
- The **x-axis** is located at the object table chest wall side edge.

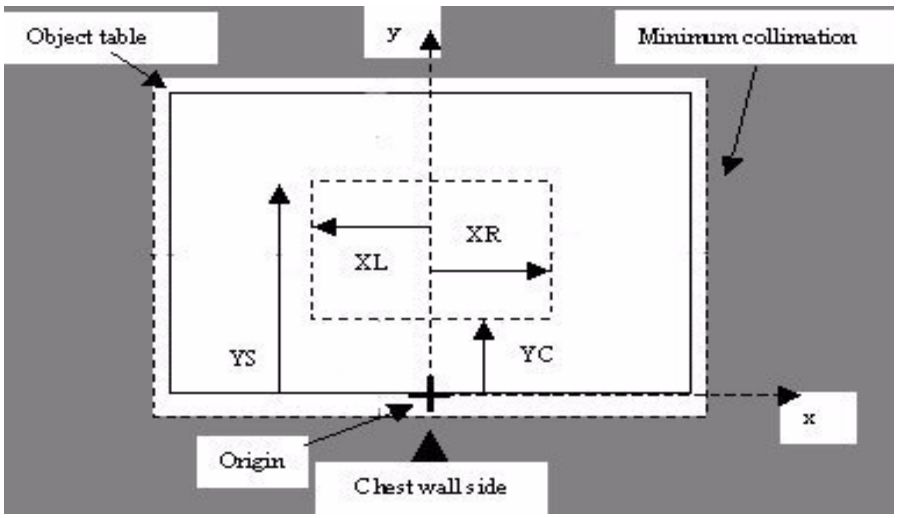


Fig. 1 Collimator calibrations

- To move the collimator **OUT**, **INCREASE** the **YC** value and **DECREASE** the **YS**, **XL** and **XR** values.

- To move the collimator **IN**, **DECREASE** the **YC** value and **INCREASE** the **YS**, **XL**, and **XR** values.

Collimator check

You have to perform the check for all foci and Mo/Mo and W/Rh anode/filter combinations.

1. Make sure that a patient is registered.
2. Mount the Collimator Mounted Phantom.
3. Connect the compression simulator.
4. Select **25 kV** and **50 mA**s on the control console.



5. Start an exposure.
6. View the image with a magnification of 4.
7. Slide the magnification glass along the image edges and check if white lines are visible.

NOTE

If you do not see white lines at the edges of the image, the collimator beam calibration is correct and you can continue with the "Collimator field light calibration" on Page 10 - 5.

Otherwise continue with the "Collimator beam calibration" on Page 10 - 2

Collimator beam calibration

The collimator must be calibrated for each focus including the field light focus.

1. Connect the compression plate simulator and the collimator-mounted plexi phantom.

2. Start the service software service PC and select
Configuration -> Collimator -> Calibration of beam field

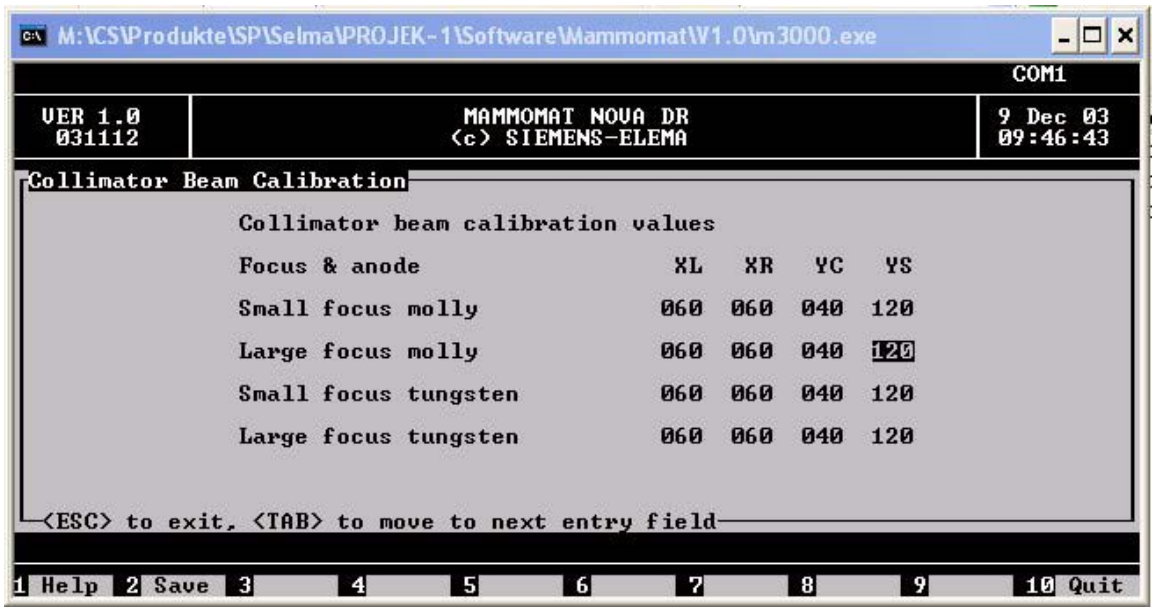


Fig. 2 Collimator beam calibration

3. Enter the numbers in the table below:

Focus and Anode	XL	XR	YC	YS
Small focus molly				
Large focus molly				
Small focus tungsten				
Large focus tungsten				

4. Narrow the X-ray field so that the edges of the detector will not be exposed to the X-ray and white lines are visible in the image at the edges of the detector.
To do this, decrease the **YC** value and increase the **YS**, **XR** and **XL** values by 5 numbers.
5. Select a **focus & anode** combination.



6. Make sure a patient is registered and start an exposure.
7. Use a magnification of 4 in the application software and go to the edges of the detector. White areas should be visible at all edges of the image. This shows you that the X-ray does not cover the entire detector and shows where the beam really ends.
8. Measure the white line thickness at each image edge with the application graphical user interface and adjust the corresponding **XL**, **XR**, **YC** and **YS** values with the service software



9. Start an exposure.
10. Check if the white lines at the edges of the image are gone, using a magnification of 4 in the application graphical user interface.

11. Repeat the procedure for all foci, until all white lines at the image edges are gone.
12. **Save** the calibration and **Exit** from the Service Software.

NOTE	**If you see a white thin line on the chest wall when using the magnification table, it might be the magnification table itself. Move the magnification table out, by approximately 1 mm and try again.**

13. Record the measured values in the **Installation Protocol** (SPB7-250.813.01...) **.**

Collimator field light calibration

Calibration for the field light is carried out as follows:

1. Start the service software on the service PC and select:

   Configuration -> Collimator -> Calibration of light field

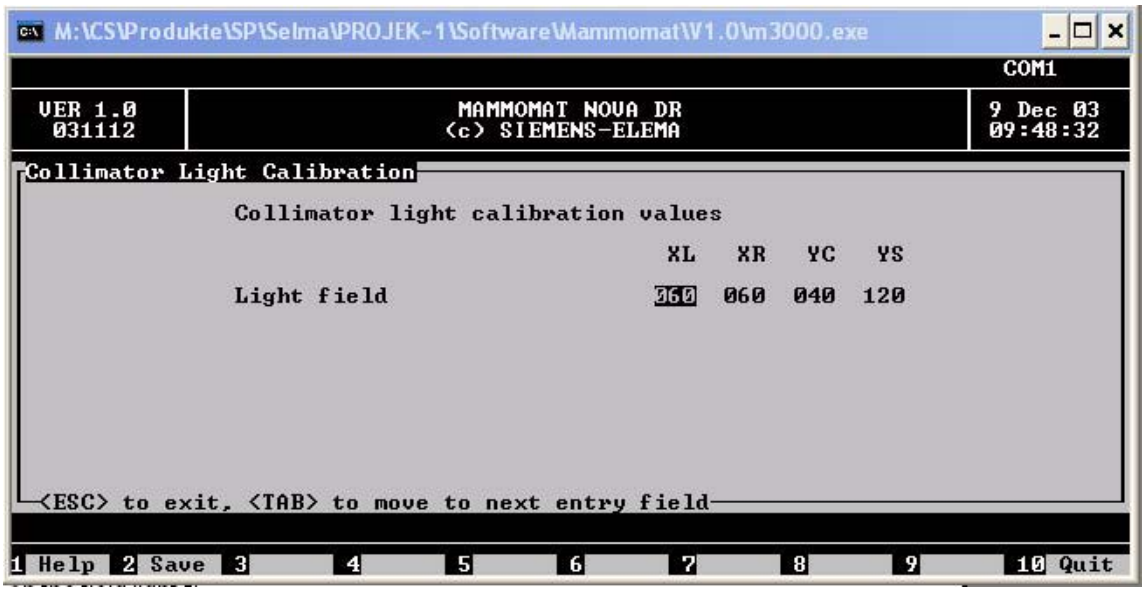


Fig. 3 Collimator light calibration

2. Position the X-ray cross in the center of the detector.
3. Make sure that a patient is registered.
4. Mount the Collimator Mounted Phantom.
5. Mount the compression simulator.
6. Deselect **H** and **D** on the control console by selecting 25 kV and 50 mAs on the control console.



7. Start an exposure.
8. Compare the image with the reading of the X-ray cross on the detector when the light field is turned on.
9. Adjust the difference with the Service Software.
10. Continue with Step 7 until the beam field and light field are identical.
11. **Save** the calibration and **Exit** the Service Software.



12. Record the measured values in the **Installation Protocol** (SPB7-250.813.01...) **.**

Collimator Wing Difference Calibration

The collimator wing difference calibration has to be set to **0**.

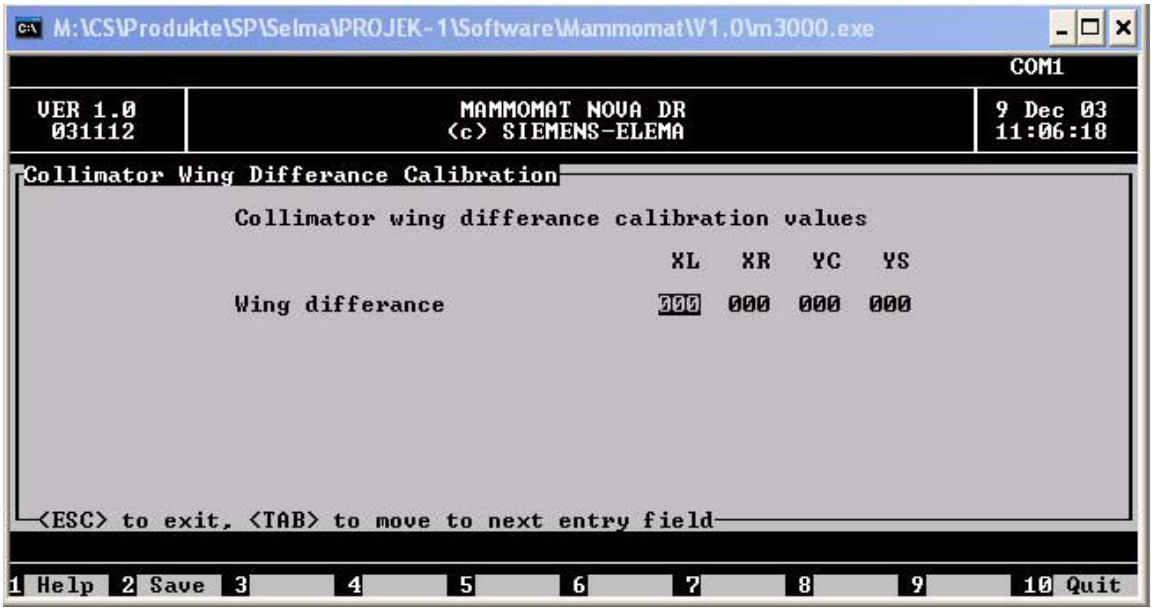


Fig. 4 Collimator wing difference calibration

1. Start the service software on the service PC and select:

   Configuration -> Collimator -> Calibration of wing difference

2. Set the values to **0**, if necessary.
3. **Save** the calibration and **Exit** the service software.

Enable/Disable Dose Calculation

If desired, the Dose Calculation System can be enabled/disabled. As a default, the Dose Calculation System is **enabled**.

This is done by starting the Dose Calculation Program in the service PC.

In the **Main menu** in the Service program choose:

Configuration ⇨Dose Calculation ⇨ Enable/Disable Dose Calculation.

To show the calculated dose values on the control console, enable this option (ON).

The dose will be shown in the mAs/mGy display (Fig. 1). The value shown will shift from mAs to dose at approximately 2-second intervals.

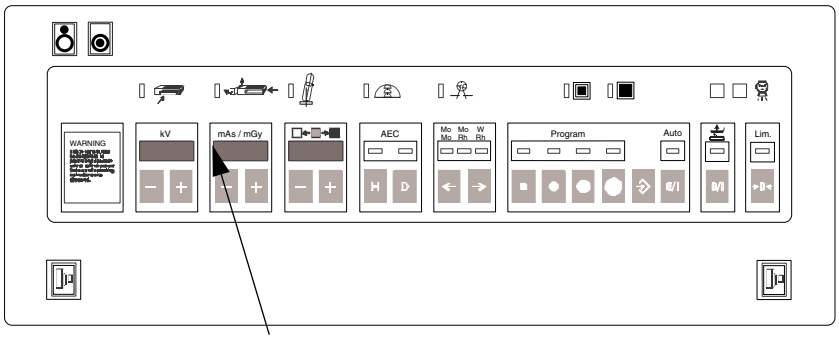


Fig. 1 mAs / mGy value

NOTE	**Selecting "OFF" will only prevent dose values from showing in the mAs/mGy display. Dose calculations will still be performed, and can be printed out if the printer option is installed.**

Configuration of Dose Calculation System

The Dose Calculation System comes with factory default values. Normally, the factory default values should be used. If desired, measurements of HVL (Half Value Layer) and Dose Exchange factors can be performed to improve the accuracy of displayed dose values. These measurements should be performed by the hospital's medical physicist, and are described in the document "**Radiographic Handbook, Dose Calculation System, SPB7-230.206.01...**". The measuring procedure is quite complicated and should only be performed by a physicist familiar to similar measurements. If the HVL and Dose Exchange values are to be measured, the document "**Software, SPB7-250.816.01...**" describes how to enter the values in the Dose Calculation Program.

If reinstalling factory default parameters, all previously entered measured data (HVL values and Dose exchange factors) will be lost. However, the measured data should already be noted in the document "**Radiographic Handbook**".

Label

If the Dose Calculation System is enabled, affix a mAs / mGy label over the "**mAs**" text on the control and display panel. The label is found in register 3 of the Technical Manual binder.

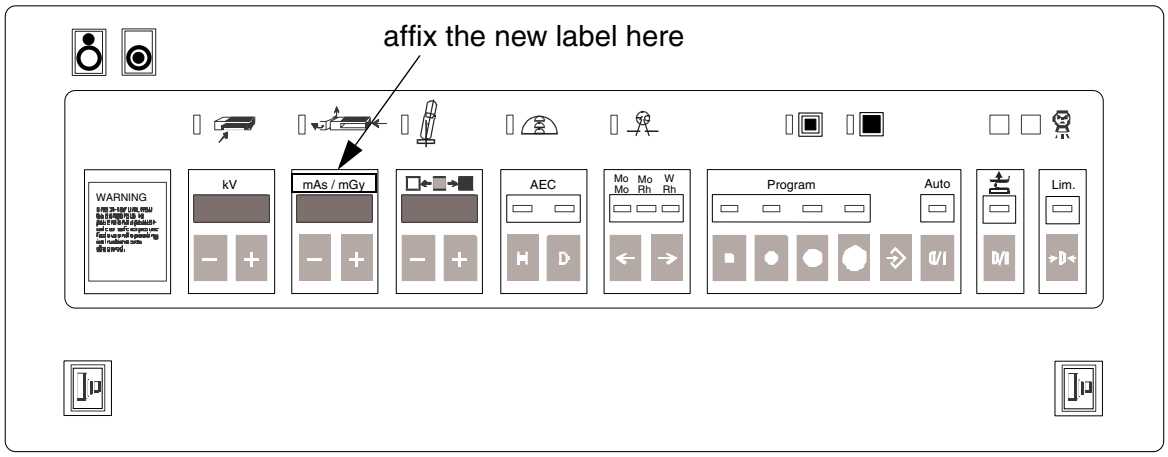


Fig. 2

Checking the AEC dose settings

The dose values for the AEC settings (**H** & **D** selection on the control console) have to be checked.

As a default from the factory, the following **BRICK / AEC Configuration** values are set. Please, see manual **Software** (SPB7-250.816.04...), for further details on the **BRICK / AEC Configuration**.

- **H = (80, 70, 45)**
- **D = (100, 80, 60)**

Check the H & D dose settings for Mo/Mo.

Proceed as follows:

1. Mount the Collimator Mounted Plexi phantom and the compression plate simulator.
2. Select the appropriate exposure parameters according to the table.

AEC	kV	Anode / Filter	Dose Value	Pixel Value
H	28 kV	Mo/Mo		
D	28 kV	Mo/Mo		

Tab. 1 Check the H & D dose settings for Mo/Mo

3. Position the dose meter probe 4 cm from the chest wall edge and 4 cm off the center of the detector.

NOTE

If parts of the meter probe covers the AEC sensor one will get a higher dose.

Thus, make sure that the probe is not covering the AEC sensors. One can check this with the mounted compression plate. The AEC sensors are drawn on the compression plate.



4. Start an exposure.
5. Measure the following values and add them to the table at step 2:

   - **dose value** in the table above. The measured AEC dose values shall be between:

     H -> 120 µGy to 140 µGy

     D -> 180 µGy to 200 µGy

   - image **pixel value** (Click on **ROI** and select 128x128 via **User Draw** .) at approximately 2 cm above the chest wall at the center of the detector. Criteria: The expected pixel values are:

     H = 250 350

D = 300 400

6. **If the H and D dose settings have to be adjusted**, proceed with Chapter 11 "Adjust the H and D Settings" and repeat the H & D dose check for Mo/Mo.



7. Record the measured values in the **Installation Protocol** (SPB7-250.813.01...) .

Check the H & D dose settings for Mo/Rh and W/Rh.

If the Mo/Mo AEC dose values for **H & D** are within the specification, proceed as follows:

1. Mount the Collimator Mounted Plexi Phantom.



2. Select the appropriate exposure parameters according to the table and start an exposure.
3. Select the anode/filter combination according to the table and set the mAs (control console) as close as possible to the H & D mAs values (Mo/Mo) that you have measured in step 2.

   Measure the image pixel value (Click on **ROI** and select 128x128 via **User Draw**) at approximately 2 cm above the chest wall at the center of the detector.

   Add the result to the table.

Anode / Filter	AEC	kV	Pixel value
Mo/Rh	H	28 kV	
	D	28 kV	
W/Rh	H	28 kV	
	D	28 kV	

Tab. 2 Check the H & D dose settings for Mo/Rh and W/Rh

   The Mo/Rh and W/Rh pixel values must be as close as possible to the Mo/Mo pixel values (see table at step 2).

   The deviation must not exceed +/- 20%.

4. If the **H & D** dose settings have to be adjusted, proceed with Chapter 11 "Adjust the H and D Settings" and repeat the **H & D** dose checks for Mo/RH and W/Rh.



5. Record the measured values in the **Installation Protocol** (SPB7-250.813.01...) .

Adjust the H and D Settings

To adjust the

H value, go to **Modify low dose scaling** (80, 70, 45) and

D value, go to **Modify high dose scaling** (100, 80, 60) and

enter the new values, separated by a comma, e.g. **100,80,60**. The values represent the factor in % for (Mo/Mo, Mo/Rh, W/Rh).

Three settings **try** (short-term, valid for one measurement only), **save** (long-term, valid also after reboot) and **load** (effective, valid until the system is rebooted) can be used in the drop-down menu above the values.

To change the values permanently, enter the correct values and select **save**, then use **load** to load them before you start another exposure.

Calculation of the new Mo/Mo dose scaling value:

$$NewScalingValue = OldScalingValue * DoseValue_{Nominal} / DoseValue_{Measured}$$

$DoseValue_{Nominal}$ for H = 130 µGy

$DoseValue_{Nominal}$ for D = 190 µGy

Calculation of the new Mo/Rh, W/Rh dose scaling values:

$$NewScalingValue = OldScalingValue * PixelValue_{Mo/Mo} / PixelValue_{Measured}$$

Proceed as follows:

1. Go into the BRICK service software by entering **http:// brick** in the netscape web browser. Please, see manual **Software** (SPB7-250.816.04...), for further details on how to log into the brick service software.
2. Select **Brick -> AEC Configuration**.
3. The BRICK software switches to a higher user level, thus a Username and Password have to be entered.

   Username: **root**

   Password: ******

4. Click **Modify settings.**

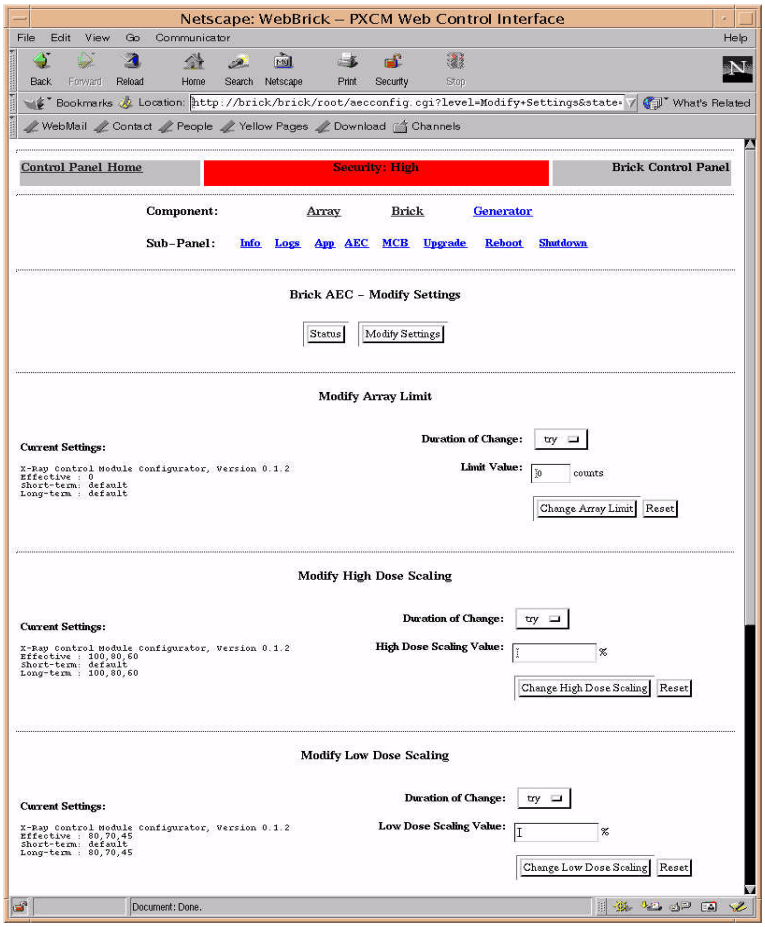


Fig. 3 BRICK - Modify settings

5. To adjust the

   - H value,
   go to **Modify low dose scaling** (the default values are 80, 70, 45) and enter the new values, separated by a comma, e.g. **80,70,45** in the **Low Dose Scaling Value** field and click **Change Low Dose Scaling** to save it.

   - D value,
   go to **Modify high dose scaling** (the default values are 100, 80, 60) and enter the new values, separated by a comma, e.g. **100,80,60** in the **High Dose Scaling Value** field and click **Change High Dose Scaling** to save it.

6. Proceed from where you have been referenced from.

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Checking OPDOSE 12 - 1

The OPDOSE values are checked in this chapter.

In AUTO mode the system suggests, in regards to a specific breast thickness, an appropriate program (kV, Anode/Filter combination). The new, suggested program is show by a blinking LED, as to where the previously used program is indicated by a continues lightened LED.

Please, see the **Instructions of Use** (SPB7-250.620.01...) for the correct OPDOSE values.

Changes can be made with the MAMMOMAT stand service software:

Configuration -> Miscellaneous-> Auto limits.

Proceed as follows:

1. Mount a 18x24 cm compression plate.
2. Select a thickness of calibration plexi (part no. 65 61 240) that is within the thickness interval of the program to be tested.
3. Select **AUTO** on the control panel.
4. Place the calibration plexi on the object table and compress to 6 kg or more.
5. Check that the correct program is blinking on the control panel. Select the program by pressing the corresponding program button on the control panel.
6. Repeat the procedure described in steps 2-5 for the other programs used.
7. Record the measured values in the **Installation Protocol** (SPB7-250.813.01)... .

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Grid lines test

This chapter contains two tests.

- TEST 1: Visible grid lines test
- TEST 2: Measuring grid lines

If no grid lines are visible in TEST 1 (TEST 2 need not be performed), TEST 2 will pass.

If grid lines are visible in one or more images in TEST 1, the grade of grid lines will be measured in TEST 2. If the **mean pixel value difference** in TEST 2 is less then 1% for the images with visible grid lines this test will also pass.

Pre-conditions

- The system is up and running.
- The operator is logged in to the system as user **apps** and a **grid lines test** patient is created.
- The compression plate simulator is mounted on the MAMMOMAT.

TEST 1: Visible grid lines test

1. Select the exposure parameters: 28 kV and Mo/Mo
2. Start exposures according to Tab. 1. When the exposures are finished select **Close Exam**.
3. Select **Admin** and open the **Spool Management**.
4. Choose the patient **Grid lines test**.
5. Select the first image.
6. Select **Apps** and then **View Image**.
7. Activate magnification **1:1** and look for grid lines over the plexi phantom area. Activate magnification **2:1** and look for grid lines at the plexi phantom area.
8. Note the result (visible grid lines) in Tab. 1, press **exit**, choose the next image in the list and start over with step 6 until all images are evaluated.

Test 1 Protocol

Exposure	Exp Mode	mAs	PMMA / mm	Tube Angle	Visible grid lines (yes/no)
1	mAs	32	30	0^o	
2	mAs	56	40	0^o	
3	mAs	110	50	0^o	
4	AEC "H"	-	40	0^o	
5	AEC "H"	-	40	$+ 60^o$	
6	AEC "H"	-	40	$- 60^o$	

Tab. 1 Grid Lines

Test 1 Criteria

The test will pass if no grid lines are visible for all exposures.

If grid lines are visible

- continue with "TEST 2: Measuring grid lines" on Page 13 - 2 on the image(s) that didn't pass.

Otherwise



- Record the measured value in the **Installation Protocol** (SPB7-250.813.01...) and
- continue with "Setting time zone, date and time" on Page 14 - 1.

TEST 2: Measuring grid lines

1. Select the first image where visible grid lines were detected (see Tab. 1).
2. Select **Apps** and then **View Image**.

3. Select **ROI** and draw a rectangle on the "background" according to Fig. 1 and Fig. 2 (X). The rectangle should be approximately 5 mm long.



Fig. 1 Measure Grid Lines

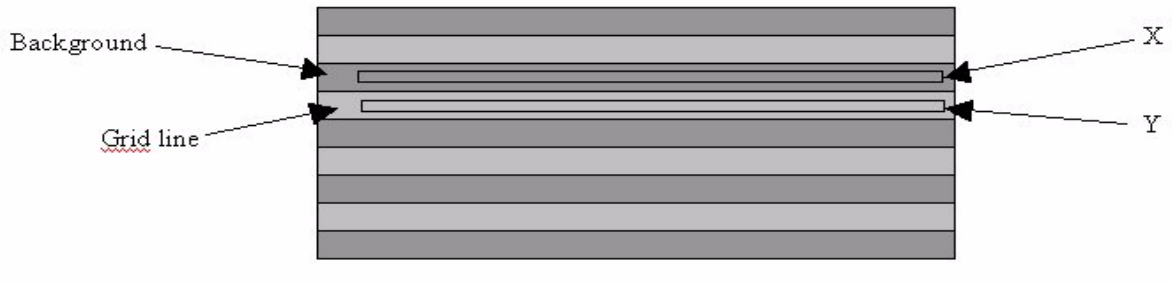


Fig. 2 Measure Grid Lines zoomed

4. Select **Plot** and note the **Mean Value** result in column **X** in Tab. 2.

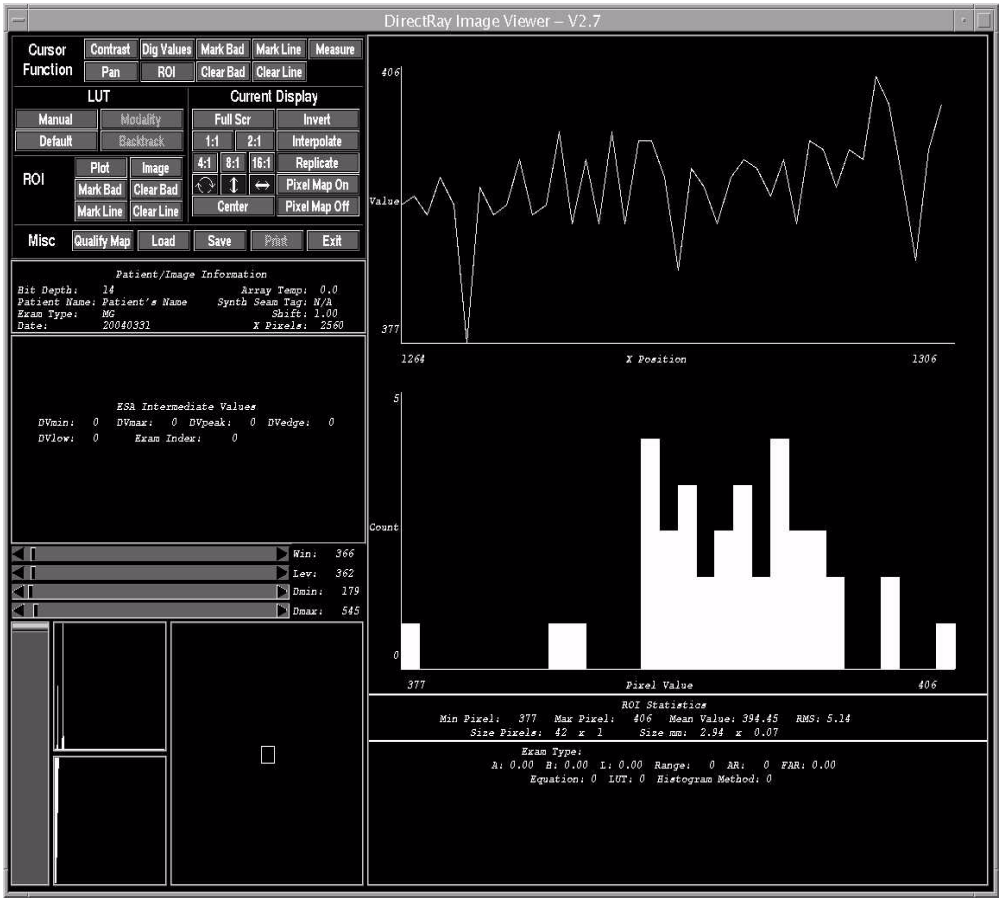


Fig. 3 Plot Grid Lines

5. Select **Image**, then make a new rectangle on a "grid line" according to Fig. 2 (Y). The rectangle should be approximately 5mm long.
6. Select **Plot** and note the **Mean Value** result in column Y in Tab. 2.
7. The mean pixel value difference shall be calculated as **(X-Y)/X** where Y is the mean value in the grid line and X is the mean value in the background as seen in Tab. 2. Note the result in Tab. 2.
8. Select **Image** then **Exit**.
9. Choose the next image that had visible grid lines in the list and start over with step 5 until all images are evaluated.

Test 2 Protocol

Expo-sure	Exp Mode	mAs	PMMA / mm	Tube Angle	Visible grid lines (yes/no)	X	Y	Mean pixel value differ-ence [%]
1	mAs	32	30	0°				
2	mAs	56	40	0°				
3	mAs	200	60	0°				
4	AEC "H"	-	40	0°				
5	AEC "H"	-	40	+ 60°				
6	AEC "H"	-	40	- 60°				

Tab. 2 Measuring Grid Lines

Test 2 Criteria

Test 2 has passed if the mean pixel value difference, due to the grid lines, is less than 1% for the exposures with visible grid lines.

If test 2 did not pass

- continue with "Fault elimination" on Page 13 - 6.

Otherwise



- Record the measured value in the **Installation Protocol** (SPB7-250.813.01...) and
- continue with "Setting time zone, date and time" on Page 14 - 1.

Fault elimination

Adjust the grid switch

The switch S1, see Fig. 4, on the detector table disables the high voltage when the grid is in the turning point. The switch must be correctly adjusted otherwise the high voltage will be active when the grid is standing still.

To minimize the risk that the high voltage is active when the grid is stationary, the time the high voltage is disabled should be as long as possible.

1. Move the grid to the left end position.
2. Loosen the three screws. Now it is possible to adjust the grid switch (S1) alongside the grid (see Fig. 4).

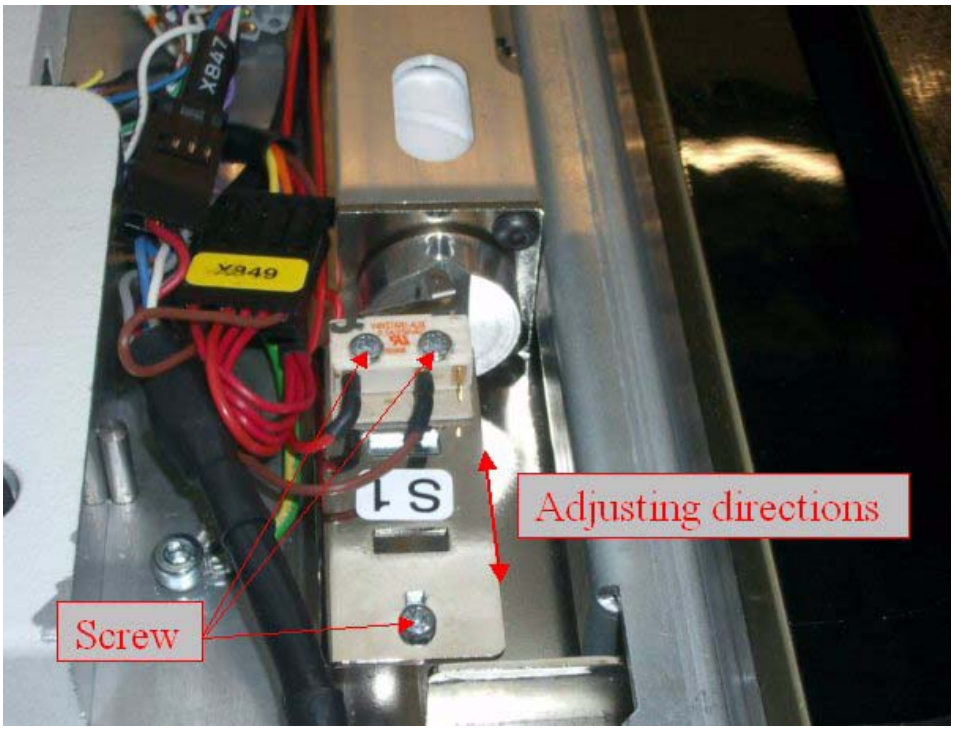


Fig. 4 Adjust grid switch S1

3. Adjust the grid switch so it will active and deactivate on either edges of the slit (see Fig. 5 and Fig. 6). You will hear a "click" when the switch activates or deactivates.

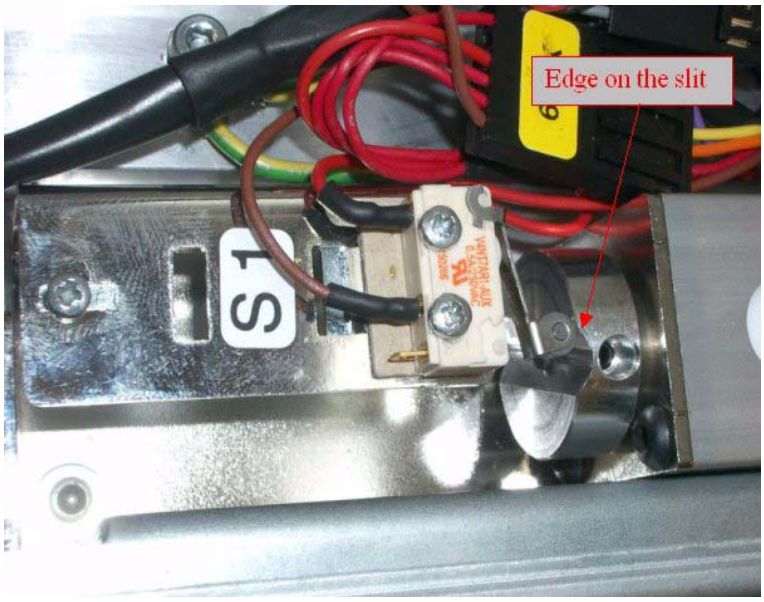


Fig. 5 Adjust grid switch on edge 1

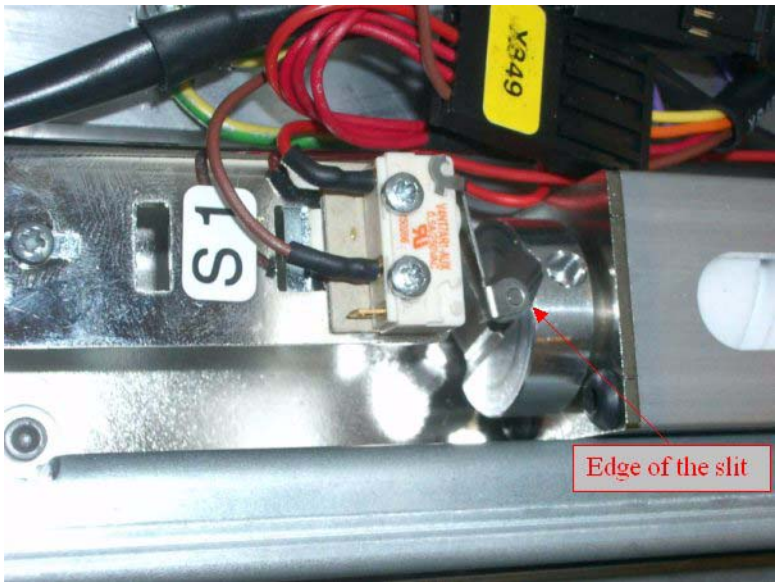


Fig. 6 Adjust grid switch on edge 2

4. Fasten the three screws.
5. Move the grid to the other end position and check that the grid switch activates/ deactivates on either edge of the slit (see Fig. 6 and Fig. 5).

Adjust the wheel that is mounted on the grid motor

A wheel is mounted on the left side of the grid motor (M1). On the wheel you will find a slit which activates the grid switch (S1).

1. Move the grid to the left end position.
2. Check if the slit is horizontal to the detector table (see Fig. 7).

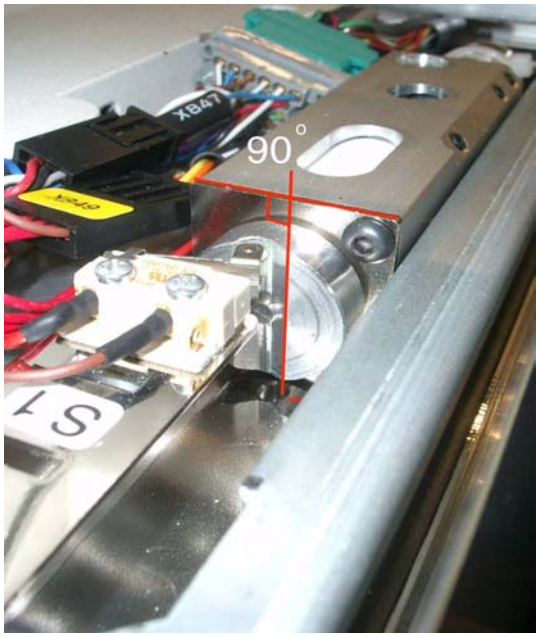


Fig. 7 Adjust grid motor wheel

3. Move the grid to the right end position.
4. Check if the slit is horizontal to the detector table (see Fig. 7).
5. If the slit is not horizontal, loosen the screw on the wheel and adjust it so the slit is horizontal in both end positions.

Adjust the grid location

1. Open the carbon detector cover.
2. Make sure the grid is mounted in parallel to the detector and lined up to the front of the table. The front switch has to be engaged.

Calibrate the detector.

1. Select **Admin** and then **Calibrate** and perform a detector calibration.

MAMMOMAT Stand date and time

Prerequisite

- The correct date and time must be set in the service PC. If not set, set the date at C:\> by typing **date** <ENTER> and the time at C:\> by typing **time** <ENTER>**.**

Test performance

1. Start the Service Software for the MAMMOMAT Stand.
2. In the **Main menu** select **Configuration ⇨Clock.**

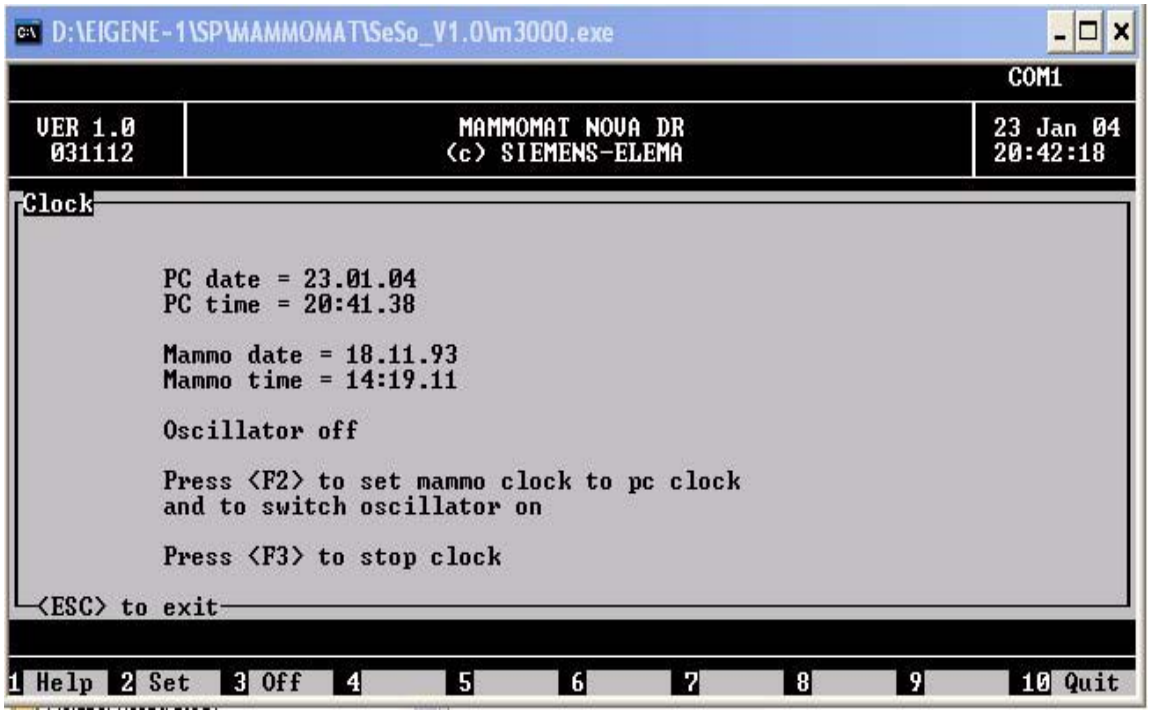


Fig. 1 MAMMOMAT Stand clock adjustment

3. Press **<F2>**.
   With **<F2>** the date and time set in the service PC are taken over by the MAMMOMAT stand.

DROC time zone, date and time

Time zone

To change the time zone, edit the file **/etc/default/init**, which contains the **TZ** environment variable, conforming to the POSIX standard.

1. Login as user **root**.
2. Open the **/etc/default/init** file with the file manager.
3. Change the value **TZ** to the appropriate time zone code.

A **timezone** item specifies an international timezone, indicated by a small set of letters. Any included period is ignored. Military timezone designations use a single letter.

+00:00	`GMT'	for Greenwich Mean,
	`UT'	or `UTC' for Universal (Coordinated),
	`WET'	for Western European and
	`Z'	for militaries.
+01:00	`WAT'	for West Africa and
	`A'	for militaries.
+02:00	`AT'	for Azores and
	`B'	for militaries.
+03:00	`C'	for militaries.
+04:00	`AST'	for Atlantic Standard and
	`D'	for militaries.
+05:00	`E'	for militaries and
	`EST'	for Eastern Standard.
+06:00	`CST'	for Central Standard and
	`F'	for militaries.
+07:00	`G'	for militaries and
	`MST'	for Mountain Standard.
+08:00	`H'	for militaries and
	`PST'	for Pacific Standard.
+09:00	`I'	for militaries and
	`YST'	for Yukon Standard.
+10:00	`AHST'	for Alaska-Hawaii Standard,
	`CAT'	for Central Alaska,
	`HST'	for Hawaii Standard and
	`K'	for militaries.
+11:00	`L'	for militaries and
	`NT'	for Nome.
+12:00	`IDLW'	for International Date Line West and
	`M'	for militaries.
-01:00	`CET'	for Central European,
	`FWT'	for French Winter,
	`MET'	for Middle European,
	`MEWT'	for Middle European Winter,
	`N'	for militaries,
	`SWT'	for Swedish Winter.

-02:00	`EET'	for Eastern European, USSR Zone 1 and
	`O'	for militaries.
-03:00	`BT'	for Baghdad, USSR Zone 2 and
	`P'	for militaries.
-04:00	`Q'	for militaries and `ZP4' for USSR Zone 3.
-05:00	`R'	for militaries and `ZP5' for USSR Zone 4.
-06:00	`S'	for militaries and
	`ZP6'	for USSR Zone 5.
-07:00	`T'	for militaries and
	`WAST'	for West Australian Standard.
-08:00	`CCT'	for China Coast, USSR Zone 7 and
	`U'	for militaries.
-09:00	`JST'	for Japan Standard, USSR Zone 8 and
	`V'	for militaries.
-10:00	`EAST'	for East Australian Standard,
	`GST'	for Guam Standard, USSR Zone 9 and
	`W'	for militaries.
-11:00	`X'	for militaries.
-12:00	`IDLE'	for International Date Line East,
	`NZST'	for New Zealand Standard,
	`NZT'	for New Zealand and
	`Y'	for militaries.

Date and Time

To see what the current date and time setting on the DROC is, use the following command:

DROC# **date**

To set the date and time on the DROC, use the following command:

DROCK# **date mmddHHMMyy**

mm - month

dd - day

HH - hours

MM - minutes

yy - year

The following example sets the system to 3:10 p.m. on November 21, 2004:

DROCK# **date 1121031004**

BRICK date and time

Setting the date and time on the BRICK.

1. Open a terminal window.
2. Log into the brick using the telnet command:
   DROC# **telnet brick**
3. Login as user **root**.
4. To see what the current date and time setting on the BRICK is, use the following command:
   brick# **date**

   To set the date and time on the BRICK, use the following command:
   brick# **date mmddHHMMyy**
   mm - month
   dd - day
   HH - hours
   MM - minutes
   yy - year

   The following example sets the system to 3:10 p.m. on November 21, 2004:
   brick# **date 1121031004**

Rotary motion

1. System **OFF**.
   The rotary motion and the vertical adjustment of the swivel arm system shall be blocked.

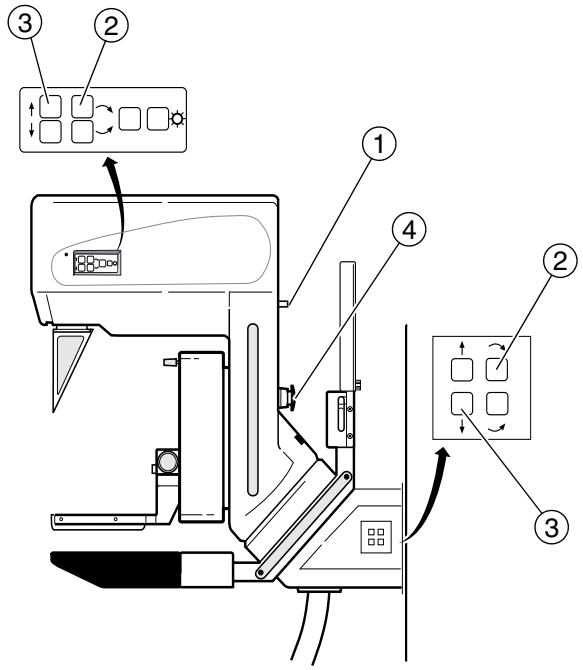


Fig. 1 Swivel arm system

2. System **ON**, object table installed and projection angle set to minimum with pre-setting knob (No. 1/Fig. 1).
3. Check the rotary motion of the swivel arm system by pressing the buttons (No. 2/ Fig. 1) one by one.
   The rotation of the swivel arm system shall stop when the button is released or when the end position is reached (+135 degrees clockwise and -180 degrees counterclockwise). The projection angle is shown on the display at the lower part of the stand.

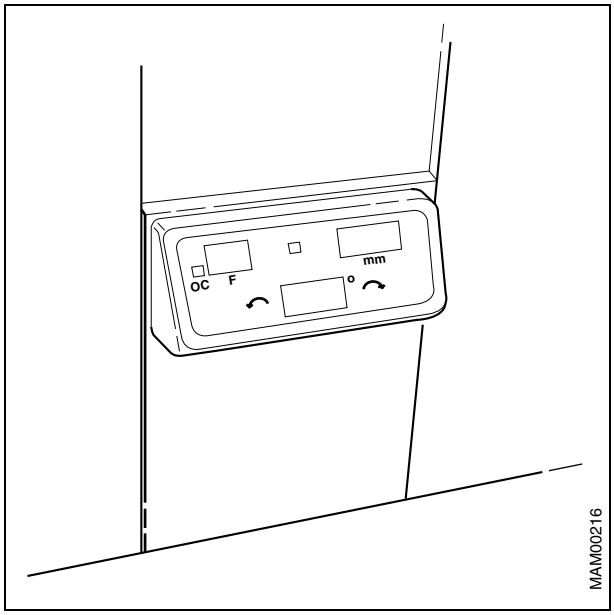


Fig. 2 Display at the lower part of the stand

1. Set the projection angle to 60 degrees with the presetting knob (1/Fig. 1).
   The preset angle is displayed for approx. 3 s.
2. Press one of the buttons (2/Fig. 1).
   The rotary motion of the swivel arm system shall stop automatically when the preset projection angle (both + and -) is reached and at 0 degrees.

NOTE

All eight rotary motion buttons (four on either side 2/Fig. 1) must be checked. After the button has been released, the swivel arm system shall remain in the position set.

Vertical adjustment

⚠CAUTION	**Remove the protective strips before performing the vertical adjustment of the swivel arm.** **If not removed, the protective strips could be damaged.** **Make sure the protective strips are removed before adjustments, see page 3 - 8.**

1. Press the buttons for upward and downward movement (3/Fig. 1) of the swivel arm system.
   The movement shall stop automatically when either the end position is reached or when the button is released.

NOTE	**All eight vertical adjustment buttons (four on either side 3/Fig. 1) must be checked. The switching off in upper and lower end position is effected by switches S881 and S884 respectively.**

Emergency stop

1. Press the emergency stop button (4/Fig. 1).
   The button shall latch and all motorized movements of the equipment shall be blocked ("Er 813" or a simular error message shall appear). To reset the emergency stop button, turn it clockwise.

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Checking the field light time

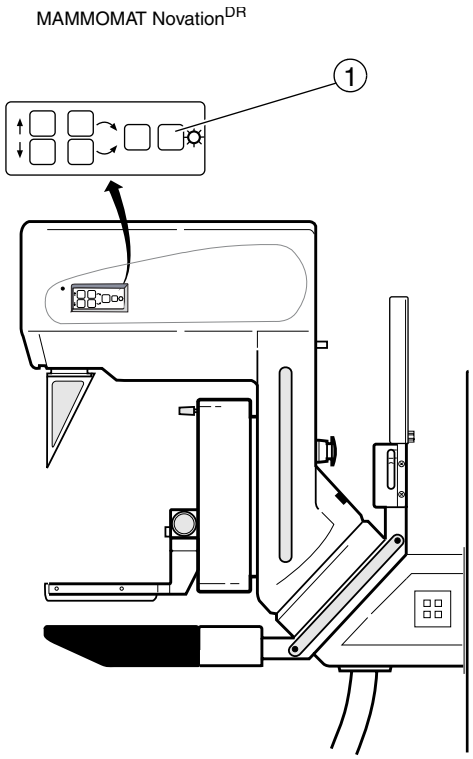


Fig. 1 Field light switch

1. Switch on the field light by pressing the switch (1/Fig. 1) or by pressing the compression foot switch (1/Fig. 2).

   The field light shall go out automatically after a preset period of time (normally 20 s.).

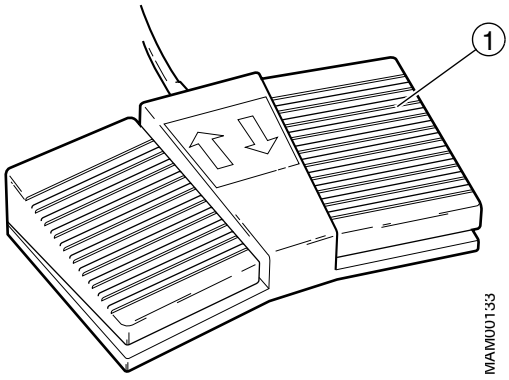


Fig. 2 Foot switch

Adjusting the field light time

The illumination time of the light field can be adjusted within a certain range according to the customer´s requirements.

NOTE	**A shorter illumination time results in an increased life time of the lamp.**

1. Connect the service PC to the D750 and start the program as described in Chapter 23 "Appendix".
2. In **Mainmenu** select **Configuration ⇨ Miscellaneous ⇨ Illumination time**.
3. Type in the illumination time and save with <F2>.

Checking the compression device

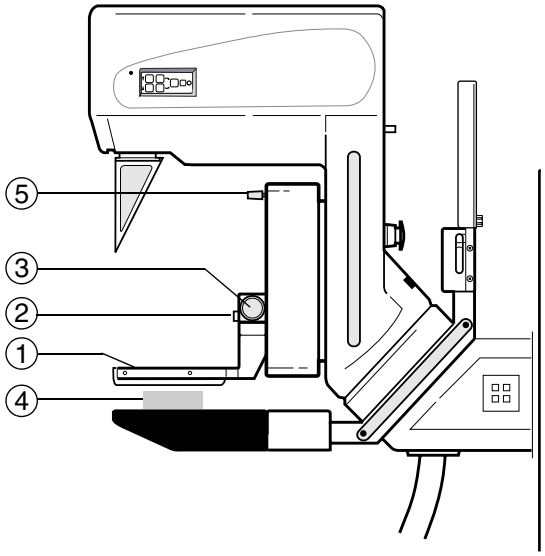


Fig. 1 Swivel arm system

1. Attach the compression plate (1/Fig. 1) if you have not already done so.
2. Check that the compression plate cannot be removed without pressing the compression plate release button (2/Fig. 1).
3. Check the function of the knobs for manual compression/decompression (3/Fig. 1).
4. Place a piece of soft material on the object table, for example a rolled up towel or a piece of foam rubber (4/Fig. 1).
5. Check the function of the foot switch for motorized compression/decompression (1 and 2/Fig. 2).

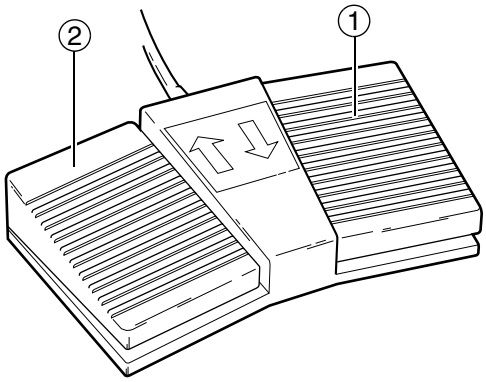


Fig. 2Foot switch

6. Press the foot switch for motorized decompression to move the compression plate upwards while at the same time pressing the compression plate in the opposite direction by hand.
   The upward movement of the compression plate shall now stop (safety switch).

7. Set the compression to 7 kg by using the presetting knob (5/Fig. 1).
   The preset compression force is shown on the display at the lower part of the stand (1/Fig. 3).

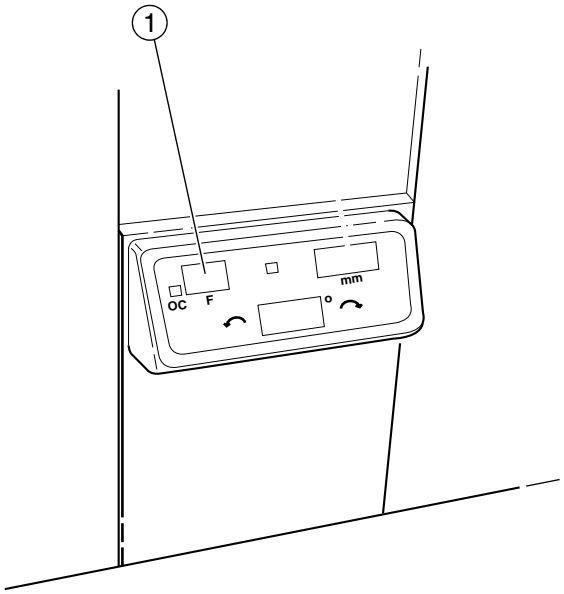


Fig. 3 Display at the lower part of the stand

8. Press the foot switch for motorized compression to move the compression plate downwards while simultaneously pressing the compression plate in the opposite direction by hand.
   The compression plate shall now slow down and stop when the preset compression force is reached.

NOTE	**During compression, the motorized vertical adjustment and the rotary motion of the swivel arm system shall be blocked.**

Decompression button

Check the decompression button  on the separate control console for proper function, i.e. that the compression plate moves upwards when the button is pressed.

Checking the OPCOMP

1. Decompress.
2. Set the compression force to 20 kg by using the presetting knob (5/Fig. 1) and compress.
   The compression movement must be interrupted by OPCOMP before 20 kg is reached, i.e. at 5-15 kg depending on the material (4/Fig. 1) used.

Adapting OPCOMP

If the factory-set OPCOMP is not to the customer's satisfaction, an adjustment can be carried out with the tautness factors in the "Best compression table", see Service Instructions. A lower tautness value will increase the compression force and vice versa.

- Increase/decrease the tautness factor by e.g. 10 the first time. Let the customer use this setting for at least two weeks before further changes are made.

NOTE	**OPCOMP has been thoroughly tested by Siemens. If any factors are changed, OPCOMP will no longer be an optimization of compression force and image quality according to Siemens' clinical test.**

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Checking the exposure blocking

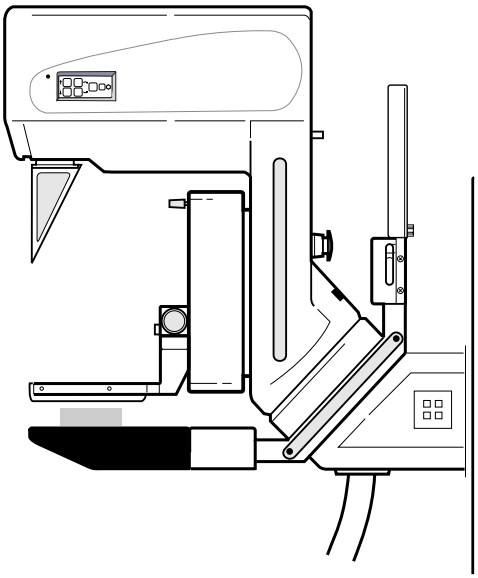


Fig. 1 Swivel arm system

Check that the exposure release is blocked during the following conditions:

- No patient is registered.
- No compression plate is mounted.
- The wing is not in position.

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General Notes

Configuration settings

NOTE

When an entry is made from the Service Tool in one of the ".cfg" files (see Fig. 1), ENTER must be pressed in order for the application to update. Looking in the .cfg file it looks as if the .cfg file is updated even though the ENTER button was not pressed (correct values appear). However, it does not come through in the application.

Keep this in mind when doing any updates !

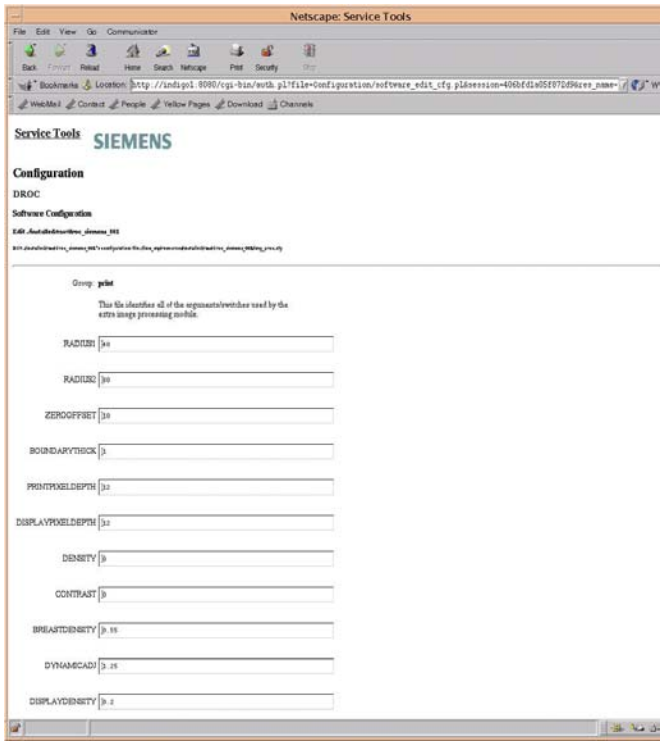


Fig. 1 General entry in .cfg files

Network connection

NOTE

The DROC acquisition workstation supports an ethernet connection of 10/100 Mbit.

Startup of DROC

Preconditions:

1. The DROC and MAMMOMAT are shut down.
2. Start the MAMMOMAT system.
3. Start the DROC workstation.
4. Login to the operating system software:

   Username: **apps**

   Password: ******

   Once successfully logged on to the operating system, the Status window lists the initialization tasks for the DROC FFDM Acquisition Workstation software functions. Each task is highlighted once it has become active and passed setup.



Fig. 2 Processes

   If the application software does not come up properly, check if the fiber optic communication link to the MAMMOMAT is working properly by checking the LED's on the BRICK.

5. The start of the application software takes approximately 3 minutes.
   After the status tests are complete, the application Login window displays at the upper-left corner of the screen.

   Login to the application software:

   Identify Yourself: **Andrea**

   Enter Password: ******

Define the DROC network settings

The Acquisition Workstation's IP address and IP netmask are initially defined during the operating system installation. The Ethernet interface is typically 10/100 base.

Setting the site name on the Service Tools page

1. Start Netscape and login with
   Username: service
   Password: ***
2. Select **DROC -> Site configuration** and change the following items:
   Site Name
   Site phone number
   Site address
   Site contact

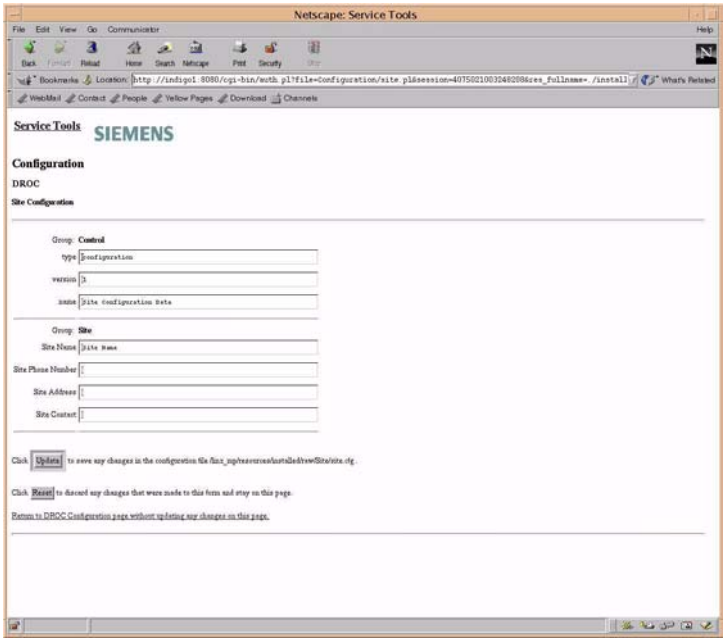


Fig. 3 Site Name

3. Click **Update**.
4. Go to Service Tools and check the entries.

Define the Acquisition Workstation's host name and IP address:

1. Log in to the operating system as **root** with the appropriate password.
2. Using a text editor, open the **/etc/hosts** file.
3. Modify the **host name** and **IP address** of the line that contains the default host name **"loghost"**. The entry should be as follows:

   <IP address><TAB>**loghost** <TAB><host name>

   Example:
   192.168.1.1 loghost Novation

NOTE	**Do not remove "loghost". You are effectively defining two IP host name aliases for the DROC Acquisition Workstation.** **Make sure you use tabs in between the tags.**

4. Save the file changes (**File -> Save**) and close the file.

Define the Acquisition Workstation's netmask:

1. Log in to the operating system as **root** with the appropriate password.
2. Using a text editor, open the **/etc/netmasks** file.
3. Add the **DROC IP address** and the **netmask** as a new line. The entry should be as follows:

   <IP address><TAB><netmask>

   Example:
   192.168.1.1 255.255.255.0
4. Save the file changes and close the file.

Define the Default Network Router IP Address

If the site‘s network includes several local networks that contain one or more DICOM devices outside of the local area network of the Acquisition Workstation, you have to define the IP address of the default router for the Acquisition Workstation's local network segment.

To define the default network router's IP address for the Acquisition Workstation:

1. Log in to the operating system as **root** with the appropriate password.
2. Open the Solaris File Manager by right-clicking on the desktop background and choosing **Files -> File Manager** from the pop-up menu.

   The File Manager window is displayed.
3. Navigate to the **/etc** folder and check whether a file called **defaultrouter** exists.
   If the file exists, go to the next step
   If the file does not exist, you have to create the **defaultrouter** file

Open the **File** menu and choose **New File**.

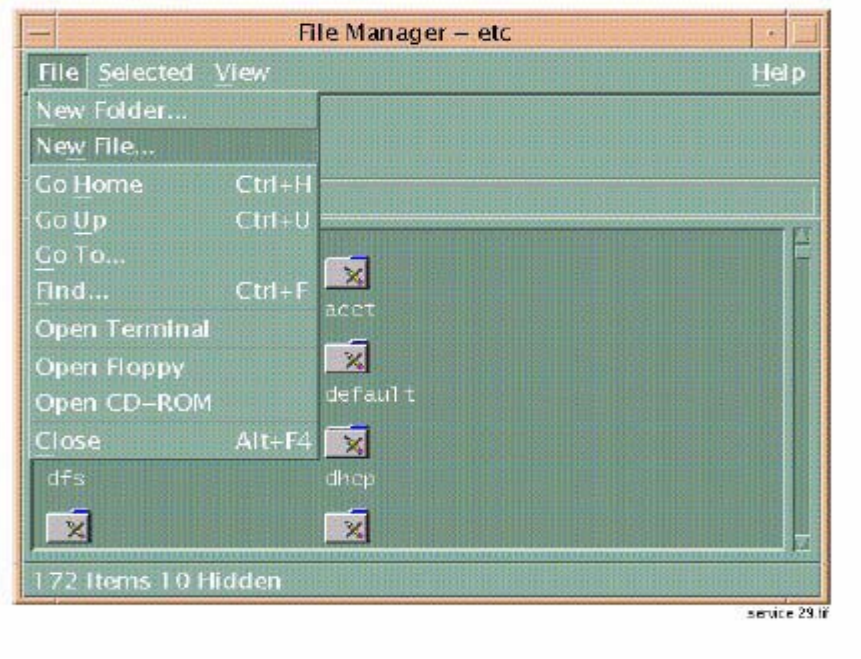


Fig. 4 Default router

The new file window is displayed.

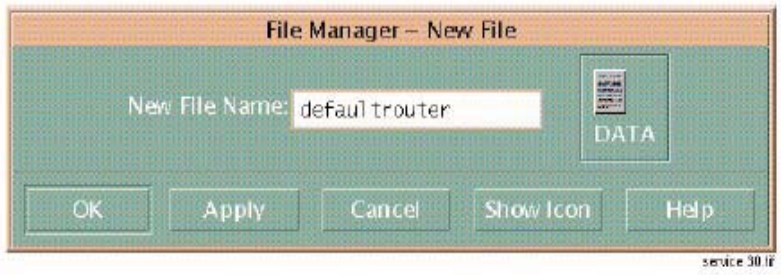


Fig. 5 Add defaultrouter file

In the New File Name field, enter **defaultrouter**, then click the **OK** button.The file should now be listed in the **/etc** directory.

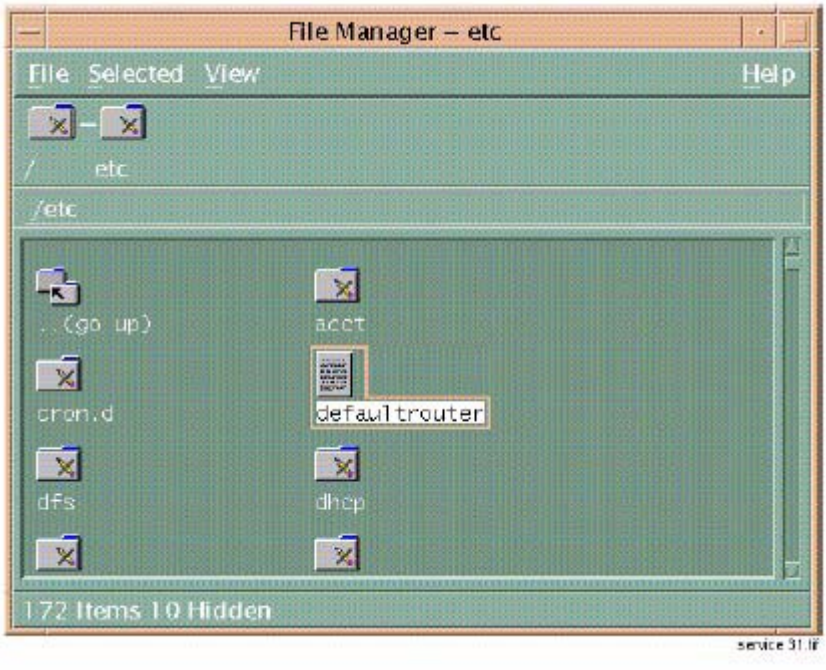


Fig. 6 Edit defaultrouter file

4. Double-click the **defaultrouter** file. The file opens in a text editor application.
5. Enter the default router's IP address. If the file already existed, verify that the IP address is correct.

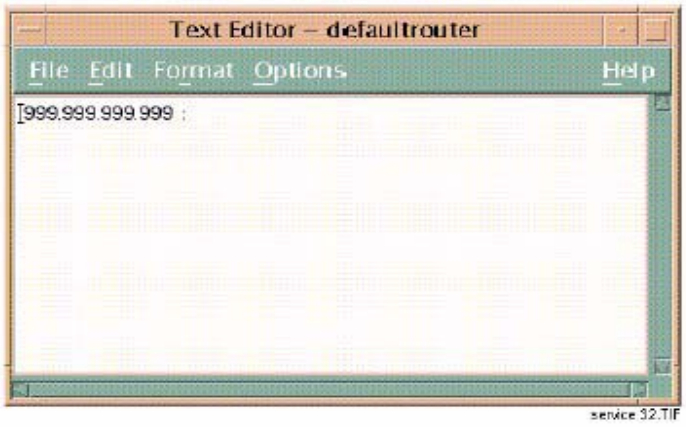


Fig. 7 Enter default IP address

6. When you have finished entering the IP address, save your changes and close the text editor.
7. Reboot the Acquisition Workstation.
8. Log in to the operating system as **root** with the appropriate password.
9. Open the Solaris Terminal window by right-clicking on the desktop background and choosing **Tools-> Terminal** from the pop-up menu.

10. Ping a network node that you want to establish a connection to by using the following command:

    # ping <IP-Address>

Configure the Acquisition Workstation's DICOM Calling AE Title

The following procedure should be performed only if the customer wants to change the default AE title (DIRECT_DIGXRAY) according to the local network setup.

During an upgrade, the previously defined Calling AE is preserved.

To specify the Calling AE Title for the Acquisition Workstation:

1. Log in to the operating system as **apps** with the appropriate password.
2. From the **Service Tools** home page and subsequent pages, click on the following links:

   Configuration: DROC
   Software Configuration
   Browse Directory ./installed/devices
   Edit Physical Device Interface for Dicom Print SCU

   The configuration file for the Print Service Class User is displayed.

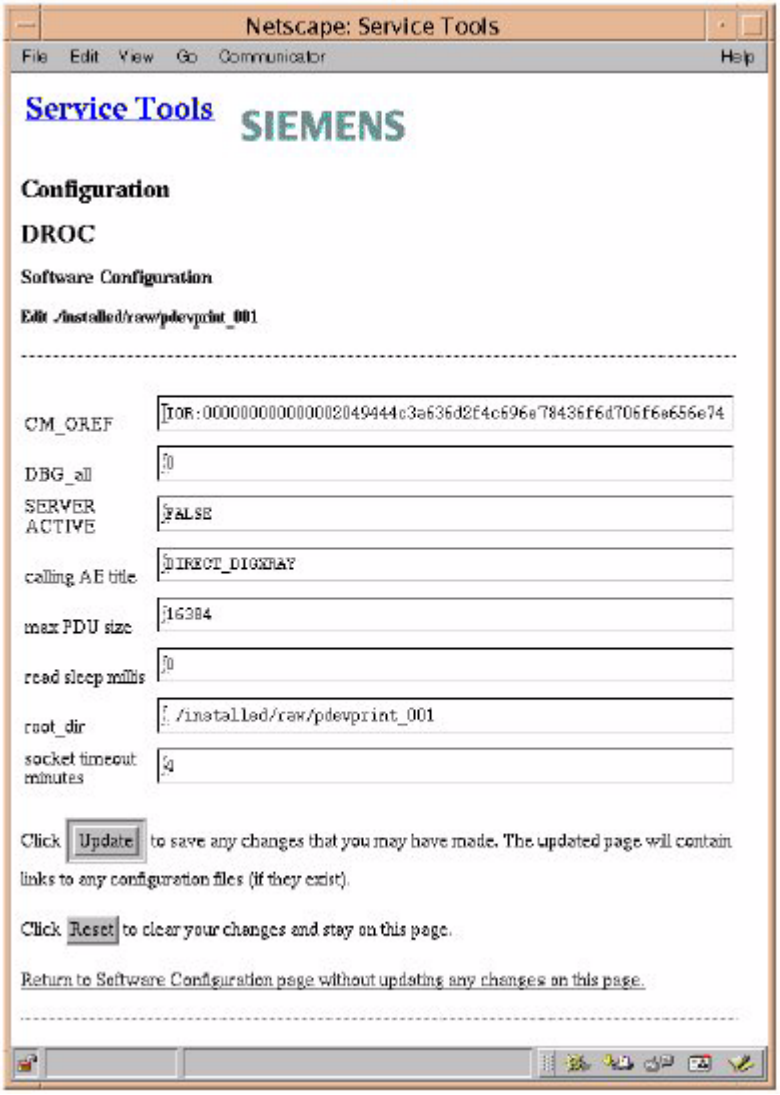


Fig. 8 Set DICOM AET

3. In the **calling AE title** field, change the Calling AE Title to the name that the site wants to use for the Print Service Class User.

NOTE	**AE titles are limited to 16 characters and are case sensitive.**

4. When you have finished entering the Calling AE Title, save your changes by clicking the **Update** button.
5. Go back to the **Software Configuration** page.
6. On the Directory **./installed/devices** page, click on the following link:
   Edit Physical Device Interface for Dicom Store SCU
   The configuration file for the Storage Service Class User is displayed.
7. In the **calling AE title** field, change the Calling AE Title to the name that the site wants to use for the Storage Service Class User.
8. When you have finished entering the Calling AE Title, save your changes by clicking the **Update** button.

DICOM Output Devices

Configuring support for output devices to which images will be sent includes the following general tasks:

- Install and configure a support package for each of the output devices.
- Configure the output setups that users will choose from in the Setup panel of the application main window.
- For printers, configure parameters specific to each printer. Determining which output device packages to install and configure if the customer's output device is not found on the list, check the latest approved list.

NOTE	**Note that some output device support packages are pre-installed as part of the system installation. You can ignore these.**

Approved cameras are:

1. Fuji FMDPL with print server PS551
2. AGFA 4500M
3. Kodak 8610

Installing Output Device Support Packages

The easiest approach when initially installing a system is to install all of the required output device support packages. Then you can go on to configure each of the DICOM output devices.

NOTE	**Make sure that the DROC application software is running with the account 'apps'.**

To install an output device support package proceed as follows:

1. From the **Service Tools** home page, click on the following link:
   Service Shortcuts -> Add New Output Device
2. Depending on which type of device you are installing a package for, click one of the following links; a list of the packages for the supported devices is displayed (as shown):

   For the CD-RW drive:
   Browse Directory ./installable/vdevices/output/cdrw

   For a Printer:
   Browse Directory ./installable/vdevices/output/laser_cameras

   For a Diagnostic Workstation:
   Browse Directory ./installable/vdevices/output/physician_displays

NOTE	**Install always "Generic Workstation Interface - MG Information Object".** **Don't install any other physician display output device.**

   For an Archive Device:
   Browse Directory ./installable/vdevices/output/archives
3. Click on the **Install** link for the package you want to install.
4. Repeat steps 2 and 3 for each output device that needs a support package installed.
5. When you have finished installing packages, return to the **Service Tools** home page.

You are now ready to configure each of the DICOM output devices.

Configuring DICOM Output Devices

For each of the DICOM output devices, you need to define the:

- **Device name** to be used in identifying the device in the application interface.
- **IP address** and **port number** of the device, e.g. 172.16.2.243:104.
- **Called AE Titles.** Besides being used during DICOM transactions, these are the names that are displayed as output devices in the Edit Setup function of the application (when a user chooses **Outputs** from the **Edit** menu). The Called AE titles for remote DICOM output devices should be available from the site's system administrator.
- **Look-Up Tables (LUTs)** to be used with images sent to soft copy devices and archive devices.

You configure this information by accessing the configuration file installed as part of the output device's support package.

The initial steps for defining the Called AE Titles and LUTs for an output device are:

1. From the **Service Tools** home page, click on the following link:
   Service Shortcuts: Configure Output Devices
2. Depending on which type of device you are configuring, click one of the following links:

   For a printer:
   Browse Directory /installed/vdevices/output/laser_cameras

   For a soft copy device:
   Browse Directory ./installed/vdevices/output/physician_displays

   For an archive device:
   Browse Directory ./installed/vdevices/output/archives

   A list of the currently installed packages for that device type is displayed.

NOTE	**Please configure ONLY the mentioned, marked (bold) fields in the various configuration screen. Changing other settings might lead to a re-installation of the entire DROC software.**

Configure a DICOM Printer

The steps for defining the Called AE Titles and LUTs for a DICOM printer are:

1. From the **Service Tools** home page, click on the following link:
   Service Shortcuts: Configure Output Devices
2. For a printer:
   Browse Directory /installed/vdevices/output/laser_cameras
3. Click **Edit** to configure e.g. the **AGFA LR5200**. The following window should appear.

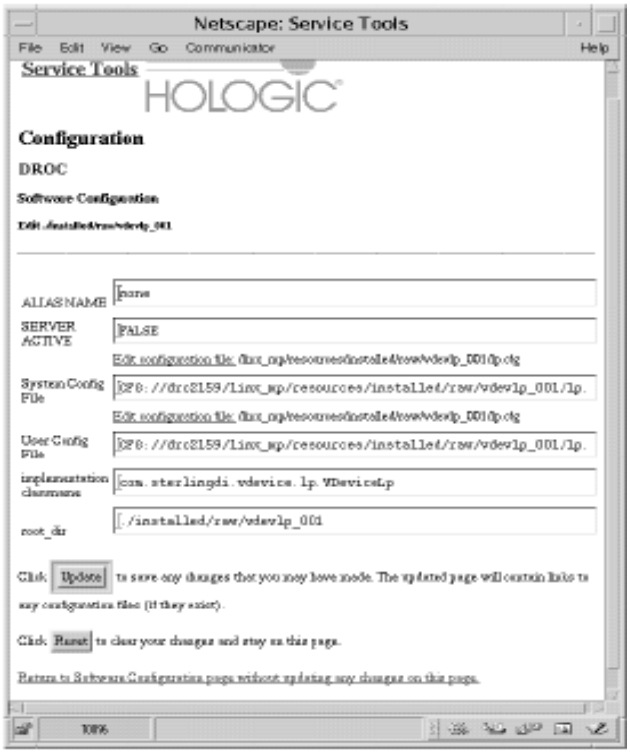


Fig. 9 Setup AET for printer

4. Change the **ALIAS NAME** field to e.g. **AGFA11_14** if you have a 11x14 film sheet or to **AGFA8_10** if you a have 8x10 film sheet and click **Update**.
   If you have both sizes then you have to do this twice.

5. Click one of the **Edit configuration file**, and the following window should appear.

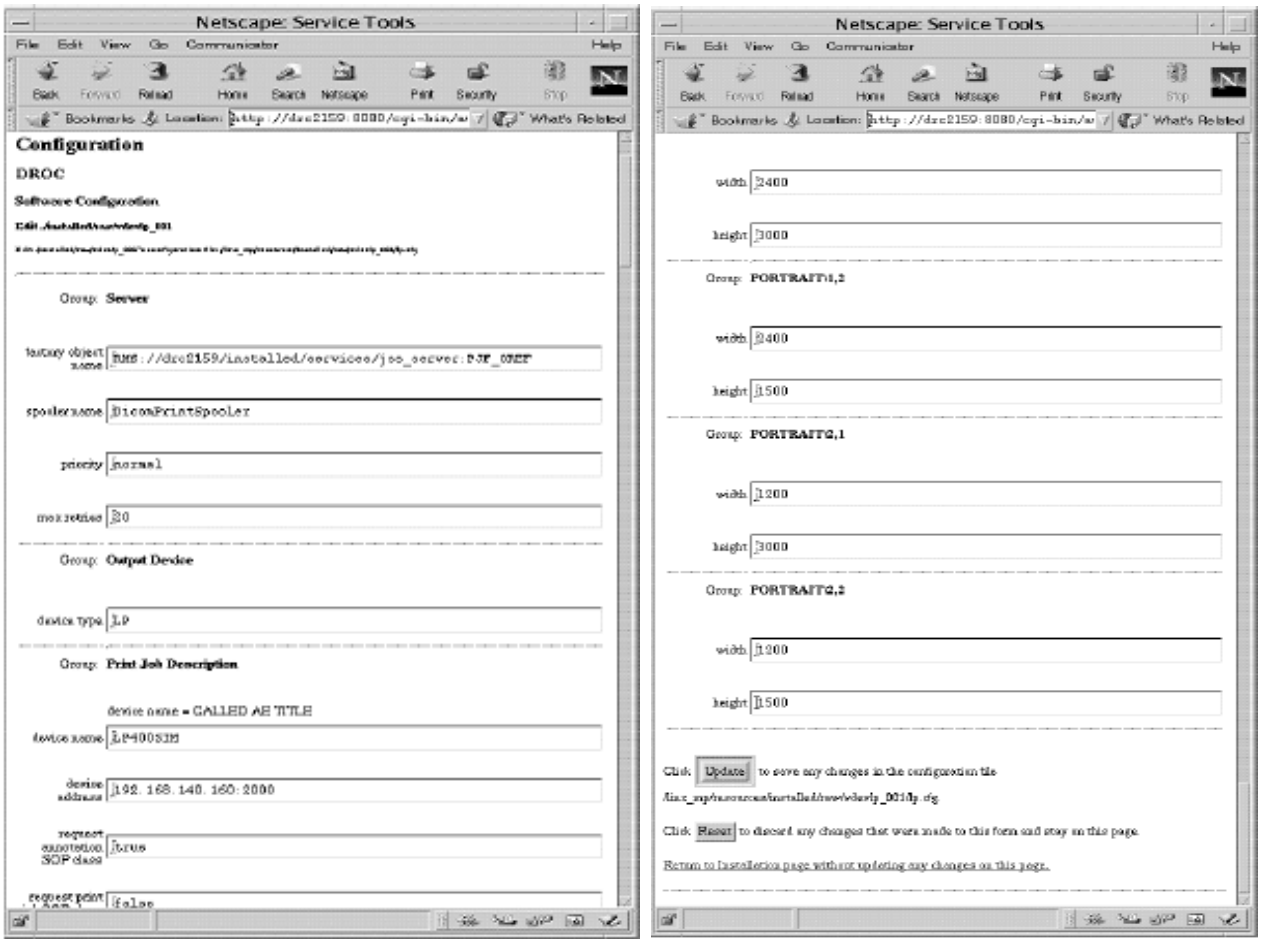


Fig. 10 Edit printer configuration

6. Enter the following information in Group **Print Job Description**:
   - In the **device name** field, the printer's Called AE Title
   - In the **device address** field, the printer's <IP address>:<port number>, e.g. 172.16.2.243:104
7. In the Group **Film Box**, change the **film size ID** to **11INX14IN** or/and **8INX10IN.**
8. Change the pixel information in group **Portrait1,1** to **6600x8512** for the 11x14 film sheet and to **4776x5944** for 8x10 film sheet.
9. When your have finished with your changes click the **Update** button.
10. Click **Return to updated installation page**.
11. Click **Service Tools**

Print Quality adjustments

In case the customer is not satisfied with the quality of the printouts, the default contrast and density can be configured.

1. Open the **Admin** menu and choose **Spool Management**.
2. Choose a patient. To choose a patient from the list, click on the patient entry.

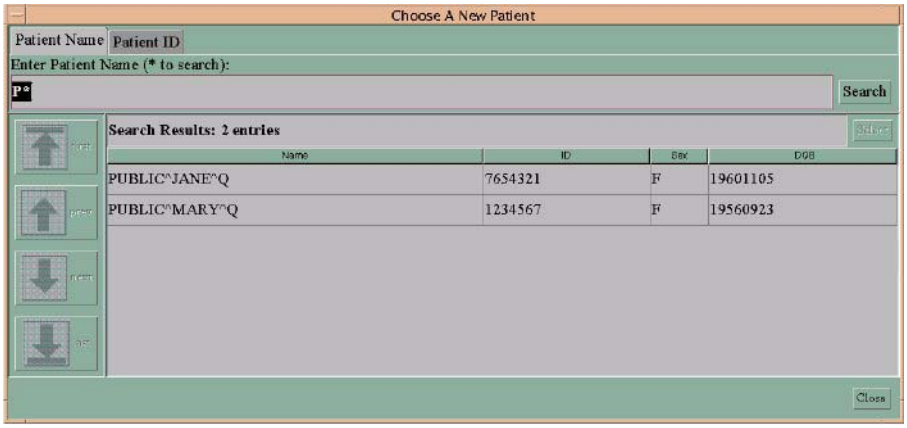


Fig. 11 Choose a patient

3. The Spool Management window displays thumbnails (minimized views) of the images, and related patient and image information, as shown below.

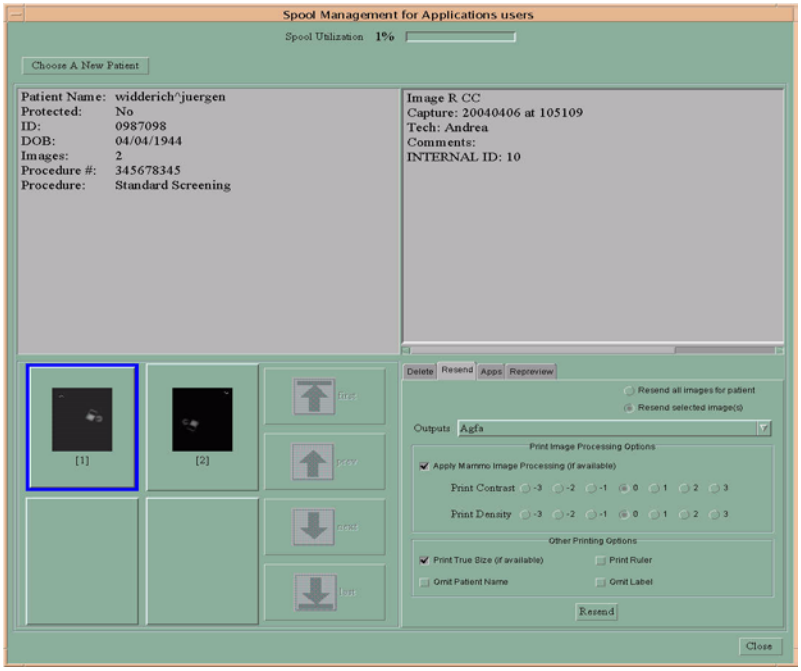


Fig. 12 Start the Spool Management

4. From the **Resend** tab, modify the options **Print Contrast** and **Print Density**, print the image and make adjustments until the customer is satisfied with the image quality.
   Make a note of the acquired contrast and density values.

5. To set the acquired values as default settings, enter the **Service Tools**.
   Go to

   DROC -> Software Configuration -> Browse Directory ./installed/apps
   Click **Edit DirectRay Operator console application**.
   Under **Extra image processing config**,
   click **Edit configuration file**:
   /linx_mp/resources/installed/raw/droc_siemens_001/img_proc.cfg.

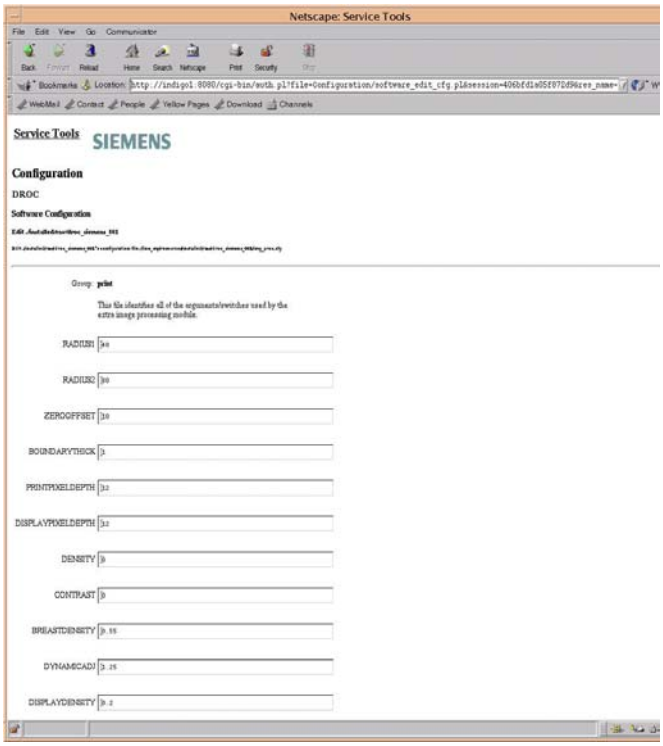


Fig. 13 Contrast and density adjustment

The **Contrast** and **Density** parameters in this configuration file are the ones that the user can adjust during resending an image to the printer (Group: **print**) or to a display device. Both are usually set to **0**. If you set them to anything else (integers from -3 to +3), then by default any processed image or resent image will inherit these parameters.

6. After changing the settings and pressing **UPDATE** the system should be restarted.

Annotation Box SOP Class (Text-on-Film)

The DICOM Print User supports DICOM Annotation Box SOP Class to display text for printers capable of printing text-on-film. The exact format of the printed text is completely dependent on the DICOM Print Server and the connected printer.

The DROC Acquisition Workstation software does not support embedding text into the image object. As a result, text-on-film is available on the film only, not the monitor.

Annotation display formats are not standardized by DICOM. The FFDM Acquisition Workstation software Print User supports the Annotation Box format described in the next topic.

The supported Annotation Box format describes a text area consisting of 4 lines, each of which is the width of the film. Three columns of annotation positions are available in each line. The left-most column is left justified text. The center column is centered text. The right-most column is right-justified text. The annotation position sequence is in row-major order (from left-to-right and top-to-bottom). The numbers inside the boxes below indicate the annotation positions that are available:

1	2	3
4	5	6
7	8	9
10	11	12

Fig. 14 Print on film

The Print User service supports a minimum of a 2-line text annotation.

An additional rule enforced by the Print User is that the number of characters for any annotation position cannot exceed 64.

Setting the Hospital Name and Address

Typically, the only fields you would change from the default settings are the Institution Name and Address fields.

1. Start the **Service Tools** page and log in with:
   Username: service
   Password: ****

2. Click **DROC -> User Interface Configuration**.

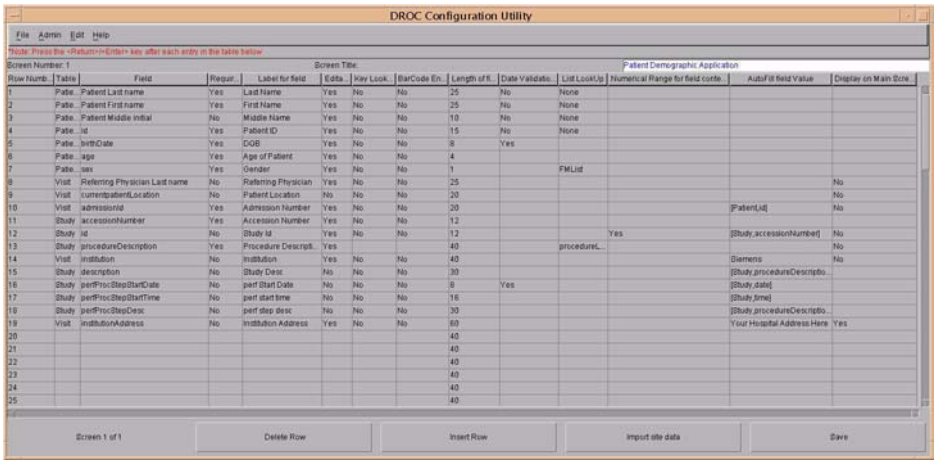


Fig. 15 Hospital Name and Address

3. Find the column **AutoFill field value** and change the text **Your Hospital Name Here** and the text **Your Hospital Address Here** accordingly.

NOTE	**Remember to close an entry by pressing the ENTER key.**

4. Click **Save** and close the application.

Configure a DICOM Viewing station

To define the Called AE Title, IP address and port number, and specify a LUT for a DICOM display device:

NOTE

For a MagicView workstation you have to disable the LUT windowing in the /home/sn_root/bin/cop/cop_env.csh script to optimize the MAMMOMAT Novation image display and windowing on the MagicView.

When the DROC is added to a SIENET environment, make sure that the receiving SIENET node has copied the field Body Part Examined (0018,0015) - and not the field Series Description (0008,103E) - onto the SIENET organ (0011, SPI RELEASE 1, 10).

It might be necessary to add the DICOM port (DROC) on a DICOM Viewing station. The DROC default DICOM port number is 104.

Please contact your PACS co-worker for more detailed information.

1. From the **Service Tools** home page, click on the following link:
   Service Shortcuts: Configure Output Devices
2. For a Viewing Station select:
   Browse Directory /installed/vdevices/output/physician_display

3. Click **Edit Generic Workstation Interface - MG Information Object** to configure the viewing station.

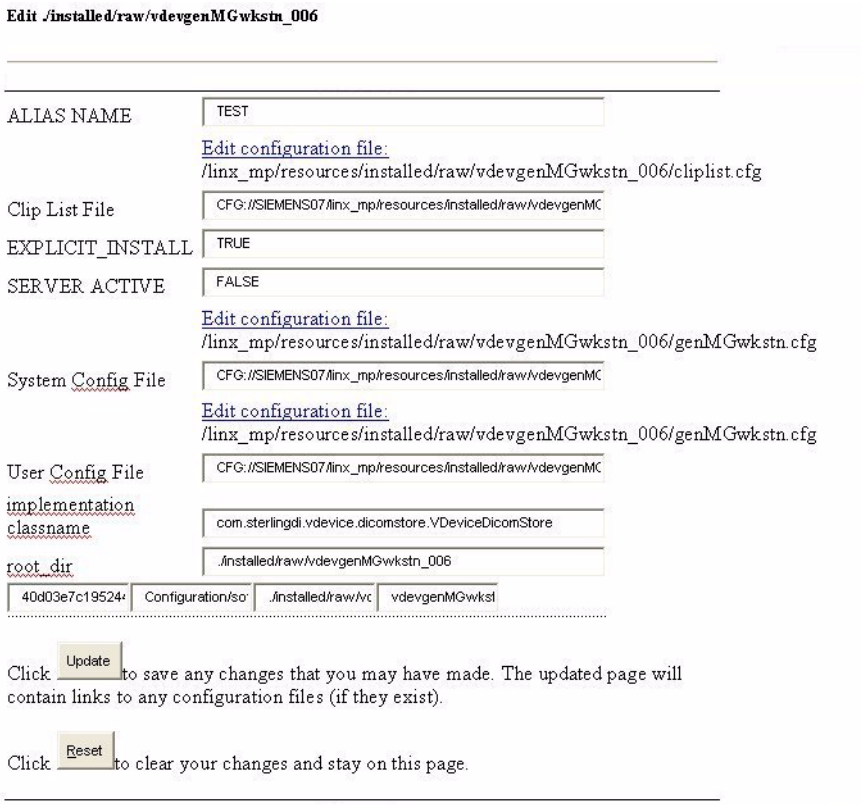


Fig. 16 Edit DICOM viewing station

Return to Software Configuration page without updating any changes on this page.

NOTE	**Make sure that you are not editing the cliplist.cfg file.**

4. In the **ALIAS NAME** field enter the name of the Viewing station. This is the name that will appear in the **Admin -> outputs** editor window.
5. Click the **Update** button to save it.
6. Click the **Edit Configuration file /linx_mp/resources/installed/raw/ vdevgenMGwkstn_006/genMGwkstn.cfg** under either **SERVER ACTIVE** or

System Configuration File fields.

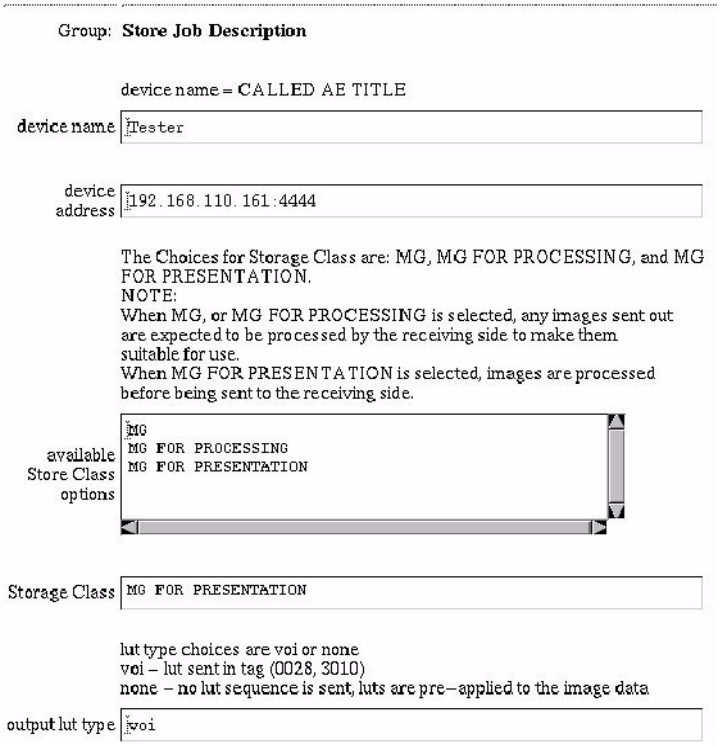


Fig. 17 Viewing station configuration file

Under **Group: Store Job description** change the following:
- In the **device name** field enter the **Called AE title.**
- In the **device address** field enter the <IP address>:<port number>, e.g. 172.16.2.243:104
- The **Storage Class** has to be **MG FOR PRESENTATION**

NOTE

If a non-Siemens PACS workstation has to be connected, the "Storage Class" "MG" might be required.

Please contact the customer's PACS contact to obtain what the workstation needs.

- In the **output lut type** field, enter **voi**, or one of the values listed in the following table, when necessary.

LUT Type Option	Description
none	Use this option if the receiving device does not handle DICOM LUT objects. The LUT will be applied to the image data before the image is sent out. Therefore, the image at the workstation will be the same as that presented on film. This is the recommended setting.
modality	Use this option if the receiving device can receive and process LUT data.
voi	Use this option if the site is sending images to a soft copy device with the DirectRay LUT tool installed.

Fig. 18 Set LUT Type option

7. Under **Group: Commit Job Description** change the following:

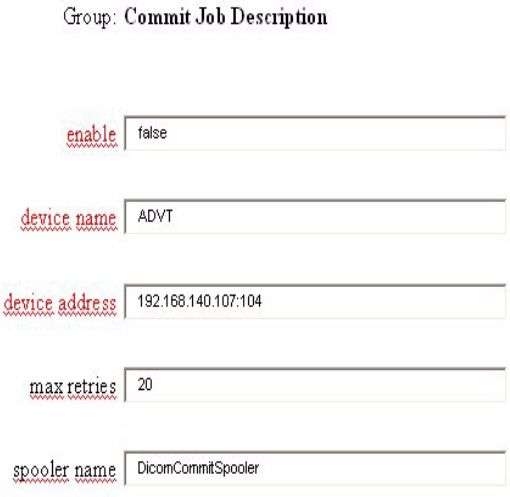


Fig. 19 Group

- In **enable** enter **false**.
- In the **device name** field enter the **Called AE title.**
- In the **device address** field enter the <IP address>:<port number>, e.g. 172.16.2.243:104
- When you are done click **Update** to save the values.

NOTE

In order to have the possibility to automatically free up space on the DROC, the DICOM Service "Storage Commitment" has to be supported, or each image has to be printed.

8. Click **Return to updated Installation Page**.
9. Click **Service Tools**.

Configure a CD drive

To define the Called AE Title, from the **Service Tools** home page, click on the following link:

Service Shortcuts: Configure Output Devices

1. For a CDRW select:
   Browse Directory /installed/vdevices/output/cdrw
2. Click **Edit** to configure the CDRW.

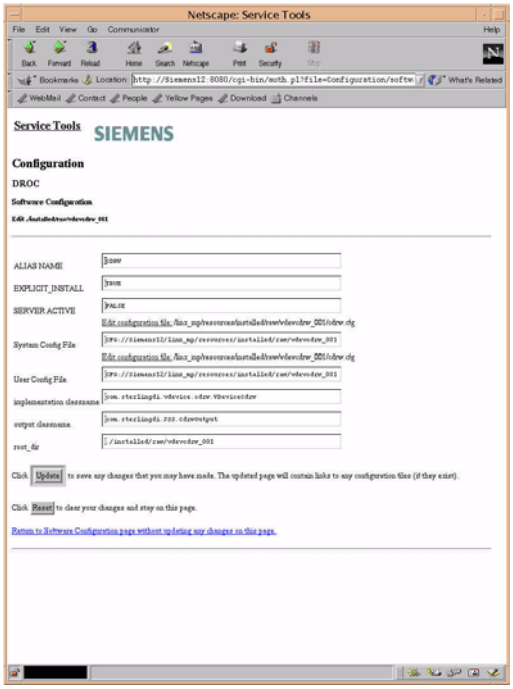


Fig. 20 Edit CDRW

3. In the **ALIAS NAME** field enter the name of the CDRW. This is the name that will appear in the **Admin -> outputs** editor window.
4. Click the **Update** button to save it.

Defining Output Device Setups in the Application Software

The term *output setup* refers to a selectable DROC Acquisition Station interface parameter that defines output destinations for transmitted images. To specify one or more output devices that acquired images will be transmitted to, users can choose an output setup from a pop-up menu on the main window.

Each output setup can identify one or more output device destinations that receive image data transmitted from the DROC Acquisition Station. For example, an output setup might include an archive device and a film printer. Each time that a specific output setup is chosen, images are transmitted to both the archive device and the printer. An output setup also defines configurable parameters, if available, for each output device chosen.

At initial installation, there are no user or default output setups. These are created by you as part of the system setup.

To create a new output setup:

1. From the DROC Acquisition Station software main window, open the **Edit** menu and choose **Outputs**



Fig. 21 Define Output setup

2. The Edit Setup window opens, with only **no outputs** listed.



Fig. 22

3. Click **New**. You are prompted to enter a name for the new output setup.

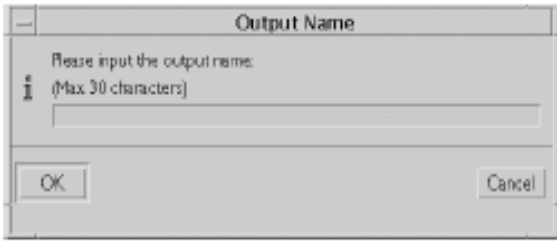


Fig. 23 Set Output device name

4. Enter the output setup name.
5. Click the **OK** button.
6. Select the new output setup name.
7. Click the **Edit** button.
   The Edit Output window is displayed.

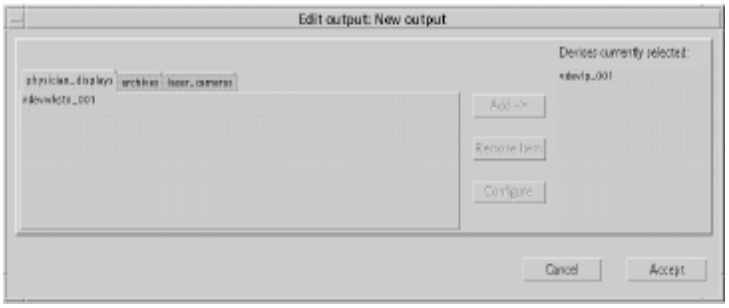


Fig. 24 Edit Output device name

Add or remove a destination device as explained in the following illustration. Only output devices already configured for the FFDM Acquisition Station as part of system configuration are listed.

NOTE	**Make sure that the alias names are used.**

NOTE	**It is possible to add multiple output devices.** **This is useful when all examinations are to be sent automatically to a Reporting Workstation, e.g. MammoReportPlus, and a PACS archive.**

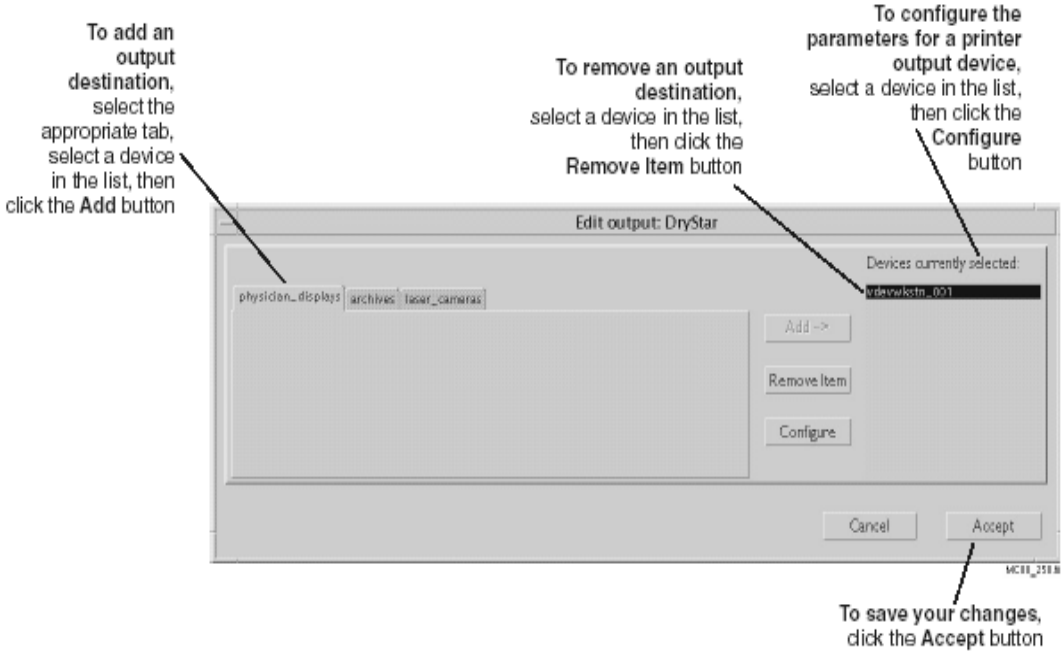


Fig. 25 Description of the Output device settings

- To save the output setup that you have defined, click the **Accept** button.
  The new output setup is now available for you to choose when capturing X-ray images.
  To cancel the changes you have made, click the **Cancel** button.
- To modify an output setup:
  1. From the Outputs Selection window, choose the output setup you want to modify.
  2. Click the **Edit** button, then make the desired changes.
  3. To save your changes, click the **Accept** button.

NOTE	**Make sure that the alias names are used.**

- To delete an output setup, choose it from the list in the Outputs Selection window, then click the **Delete** button. The output setup is removed from the Output setup pop-up menu on the main window.

Troubleshooting

In case this doesn't work, have a look to the error message in the Alarm Window and check whether the configuration at the receiving node is done properly.

If this doesn't help, please try the configuration again. We experienced problems in updating entries in the configuration list. Therefore the recommendation is to start from scratch.

To do this proceed as follows:

1. Check that the Queues (**Admin -> Manage Queues**) are all Empty; Otherwise delete all entries!
2. Go to **Edit -> Configure Outputs** and Delete the entry that causes problems
3. Go to the Service interface and select **Configure Output Devices.**

4. Select **Browse Directory ./installed/vdevices/output/physician_displays**
5. Select **Uninstall Generic Workstation Interface - MG Information Object** in the column **Edit Generic Workstation Interface - MG Information Object** with the appropriate alias.
6. After you get a message that this was successfully uninstalled, please reboot the DROC and start to configure an output device again.
7. If the message says that uninstall is not successful please reboot the DROC and try again to uninstall the device.

Modality Worklist (MWL) Service

Before you can configure the MWL Service Package, make sure that

- the MWL Server Package has been installed (see "Install the Modality Worklist Server Package" on Page 19 - 28) and
- the MWL provider's **IP address** with the host name **broker** have been added to the **/etc/hosts** file ("Add MWL server IP address with host name" on Page 19 - 29.

Install the Modality Worklist Server Package

To install the **Modality Worklist Server** Package proceed as follows:

NOTE	**Make sure that the DROC application software is running with the account 'apps'.**

1. From the **Service Tools** home page, click on the following links:
   DROC -> Software Configuration -> Add Software resources -> Browse Directory ./installable/packages

   The **Add Software Resource to the System Configuration** page displays.

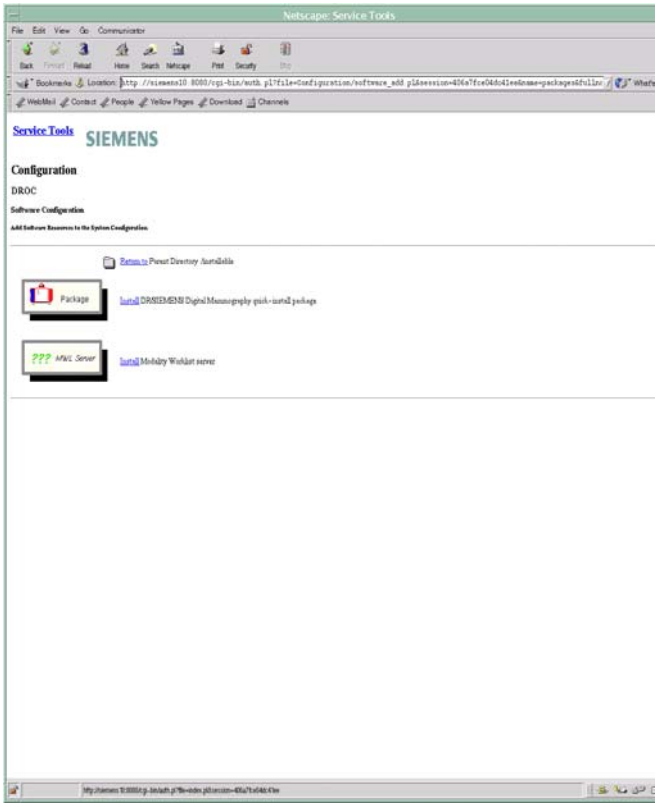


Fig. 26 Install the MWL

2. Click the **Install** link for the **Modality Worklist server** package.
3. Reboot the DROC to enable the resource package you just selected
4. After rebooting, log in as user **apps**.

Add MWL server IP address with host name

This procedure selects the MWL service. Before configuring the MWL service, you must add the MWL provider's IP address and host name **broker** to the **/etc/hosts** file.

To add the MWL provider's IP address and host name to the **/etc/hosts** file:

1. Log in to the Solaris operating system as **root** with the appropriate password.
2. Open a terminal session window.
3. Using a Filemanager open the **/etc/hosts** file.
4. Add the MWL provider's IP address and host name as an entry in the file.
   For example:
   <ID_Address><TAB>broker

NOTE **You must use the name "broker." This is the name that will appear in a drop-down list in the MWL configuration tool.**

5. Save the file changes and close the file.
6. Reboot the DROC.

Configure the MWL service

To configure the MWL service proceed as follows:

NOTE

MWL must not be running while you are attempting to configure the function. When MWL is running, it writes files. There is a possibility that MWL will overwrite a file that you have changed and your changes will not be preserved.

1. Log in as user **apps**.
2. Determine if the MWL is already running by double-clicking the DROC **Task Launcher** minimized window icon on the application desktop.



Fig. 27 DROC Task Launcher Icon

3. The DROC Task Launcher window displays.

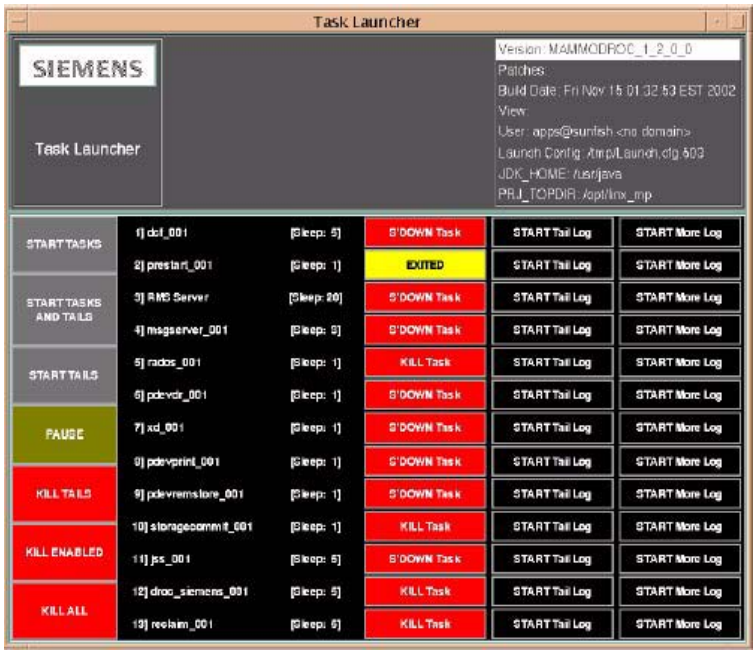


Fig. 28 Task Launcher

If the process **mwlquery_001** is not listed, go to the next step. If **mwlquery_001** is listed, click the **Kill Task** button next to the **mwlquery_001** server entry.

4. From the **Service Tools** home page and subsequent page, click on the following sequence of links:

Configuration: DROC -> Worklist Configuration

The Modality Worklist Configuration graphical user interface dialog box displays.

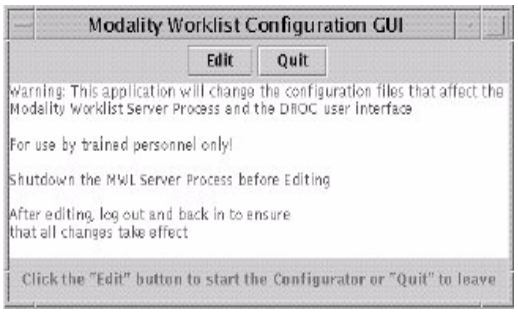


Fig. 29 Task Launcher graphical user interface

5. Click the **Edit** button.
   The MWL Configuration Tool window displays.

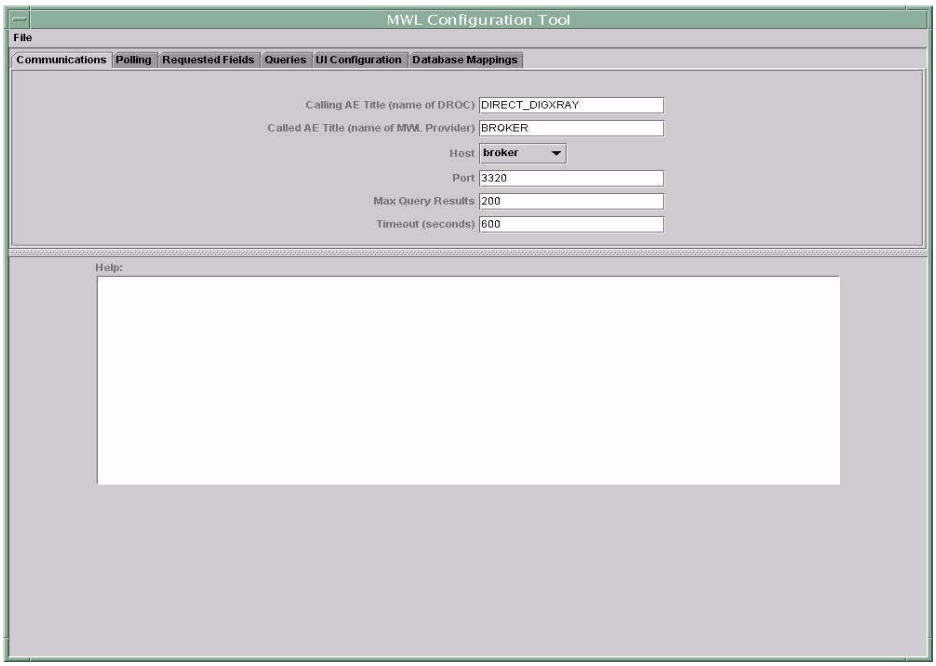


Fig. 30 MWL Config Tool

6. In the **Host** drop-down list, select **broker**.
7. Open the **File** menu and choose **Save**.
8. Click the **Quit** button in the Modality Worklist rapfical user interface dialog box.

Configure the AE Title for MWL

The AE Title for the DROC (DICOM MWL service) and the AE Title for the MWL provider will be configured in this Chapter.

NOTE	**When you have changed the default AE Title on the DROC workstation "Configure the Acquisition Workstation's DICOM Calling AE Title" on Page 19 - 8 then you have to also change it accordingly for the MWL in various MWL locations.**

Proceed as follows:

1. Select the tab card **Communications** and modify the **Calling AE Title (name of DROC)** and the **Called AE Title (name of MWL provider)** according to your local network environment.

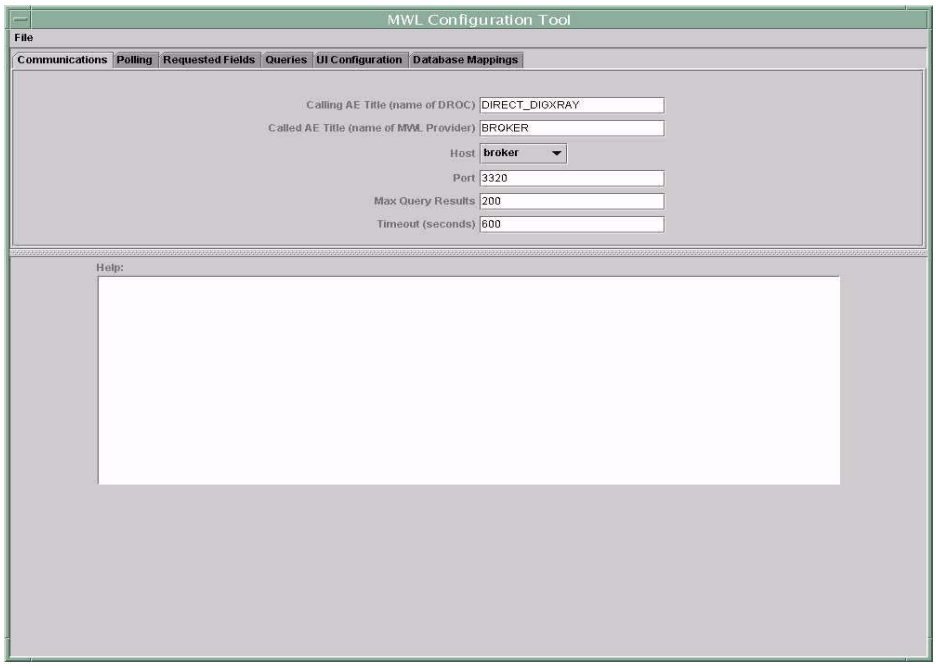


Fig. 31 MWL Config Tool - Communications

2. Select the tab card **Queries -> User Queries 1** and modify the **Schedule Station Name Fill Value** and the **Schedule Station AE Title Fill Value** according to your local network environment.

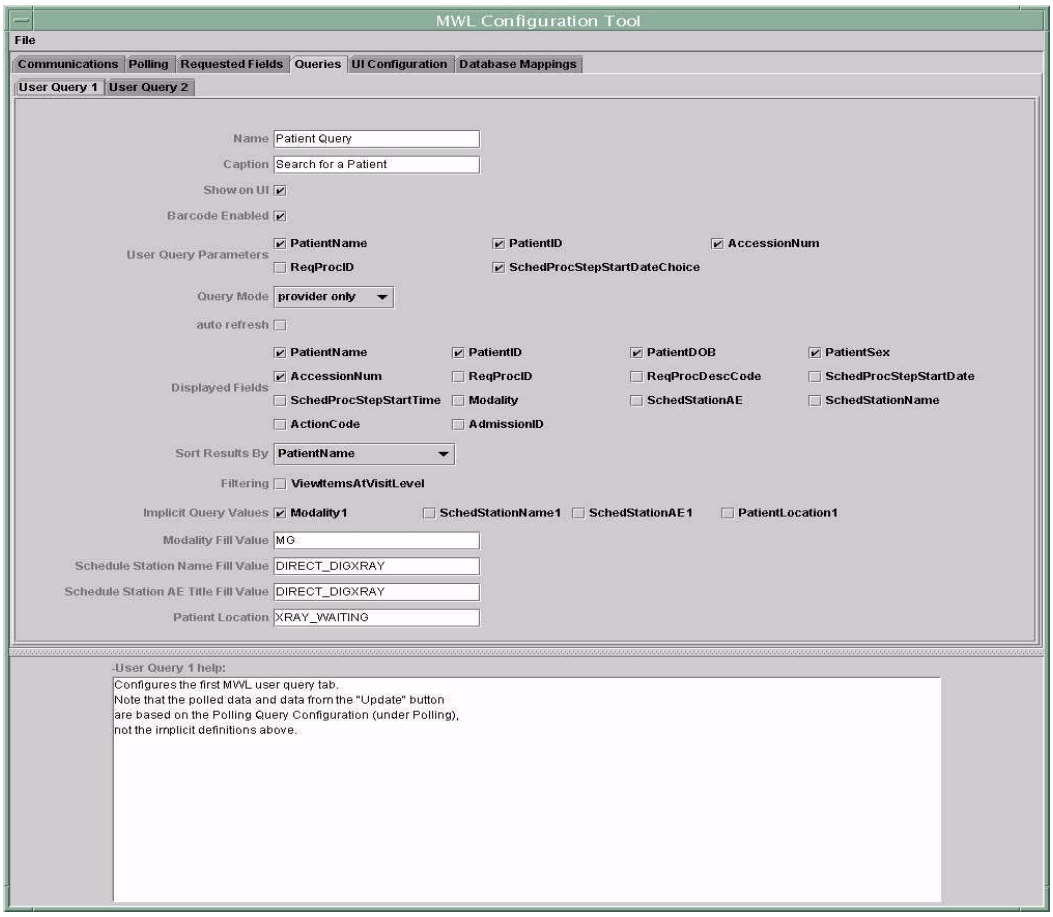


Fig. 32 MWL Config Tool - User Query 1

3. Select the tab card **Queries -> User Queries 2** and modify the **Schedule Station Name Fill Value** and the **Schedule Station AE Title Fill Value** according to your local network environment.

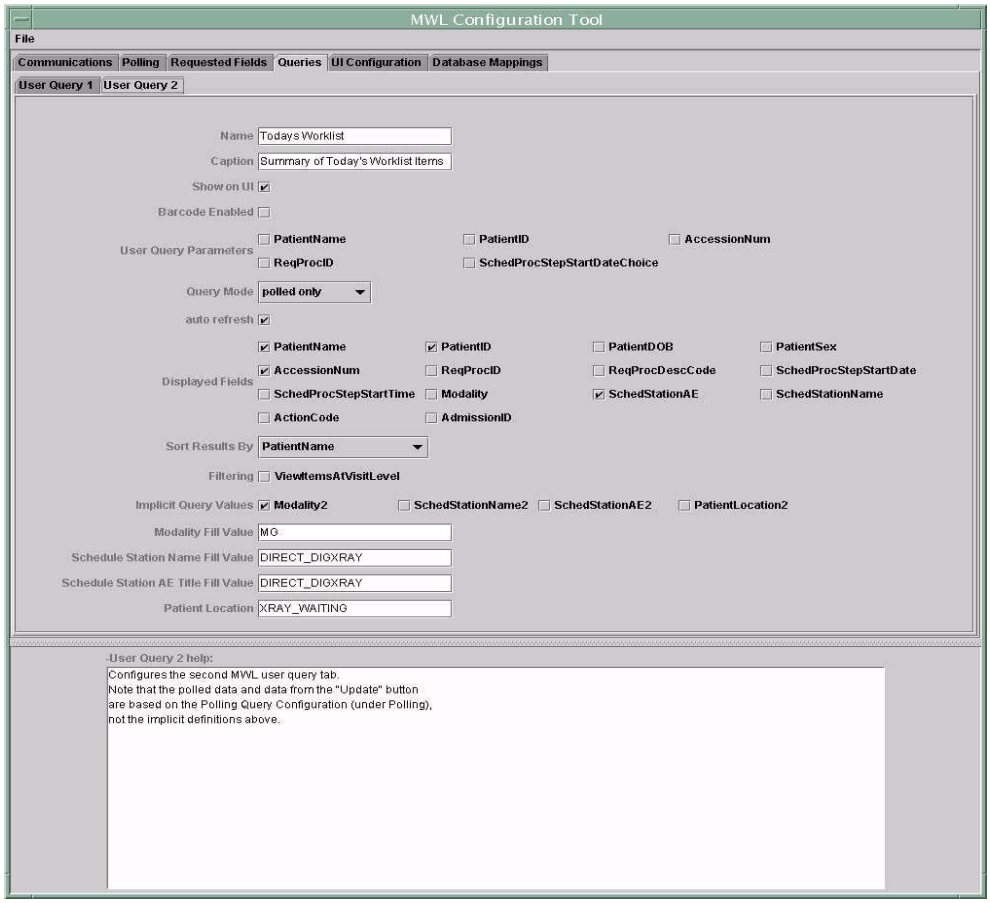


Fig. 33 MWL Config Tool - User Query 2

4. Open the **File** menu and **Save** the changes.
5. Reboot the DROC workstation.

Troubleshooting hints for the MWL configuration

You should try the MWL without changing the default settings first, before you make changes to the MWL settings.

In case of problems one can select between two scenarios:

- The worklist does not appear on the DROC, see Page 19 - 35.
- The worklist appears on the DROC, but selecting a patient creates an error message, see Page 19 - 37.

The worklist does not appear

1. Start the configuration of the MWL as described in "Configure the MWL service" on Page 19 - 30.
2. Select the Tab card **Requested Fields** and deselect the following **Name** fields by deselecting the appropriate check box under **Requests**.

   ConfidentialityConstraint

   OtherPatientID

   PaitentComments

   PatientLastMenstrualDate

   PatientSize

   PatientState

   PatientWeight

PregnancyStatus

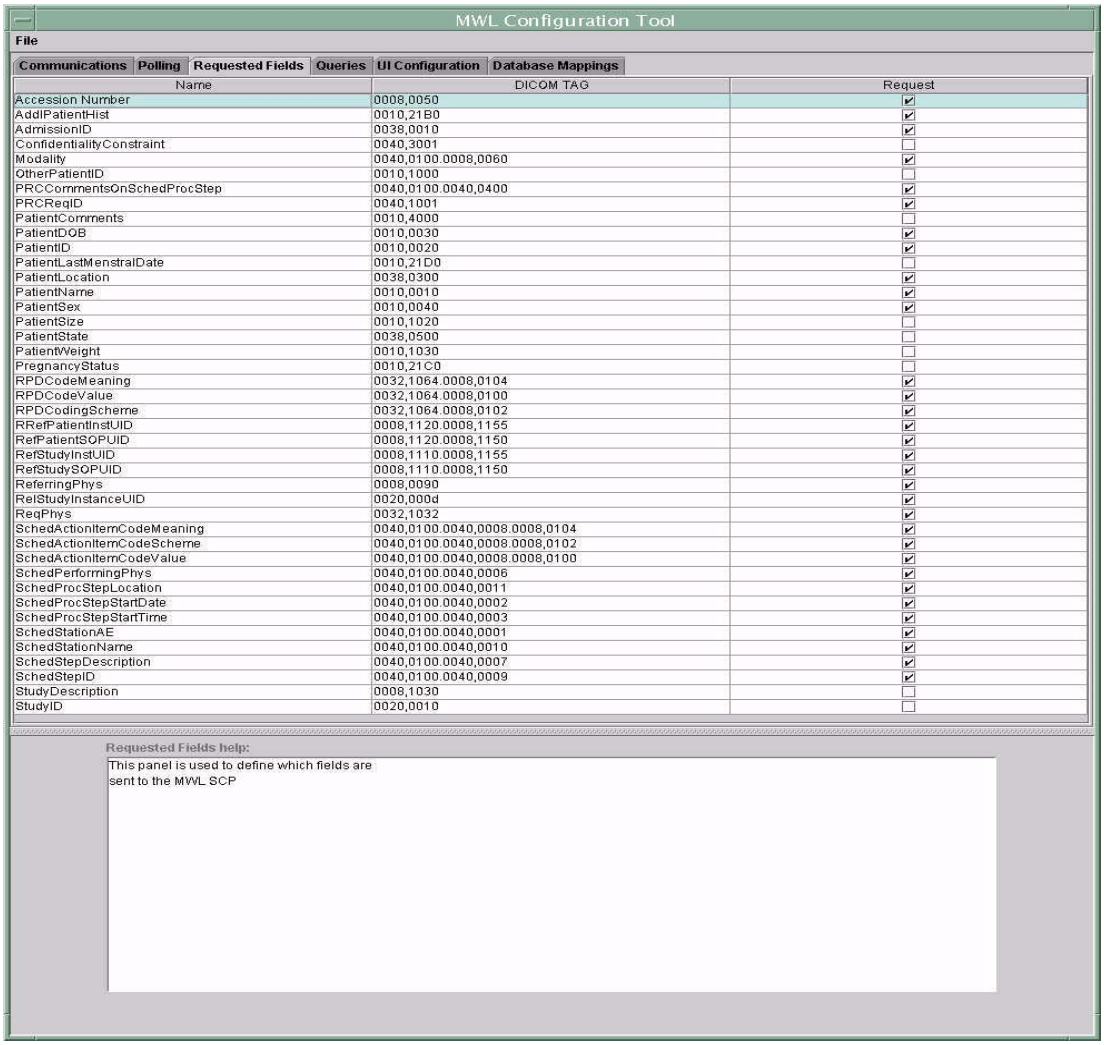


Fig. 34 Configure the MWL, Requested Fields

3. Open the **File** menu and **Save** the changes.
4. Reboot the DROC workstation.

The worklist does appear, but the patient can not be selected

1. Start the configuration of the MWL as described in "Configure the MWL service" on Page 19 - 30.
2. Select the Tab card **Database Mappings -> Visit Mappings** and change the flag **AdmissionID** (**MWL Source** column) to **PatientID,** of the Database Attribute **admissionId** (**DB Attribute** column).
   Clicking on the **AdmissionID** will show a drop down menu, from where the **PatientID** can be selected.

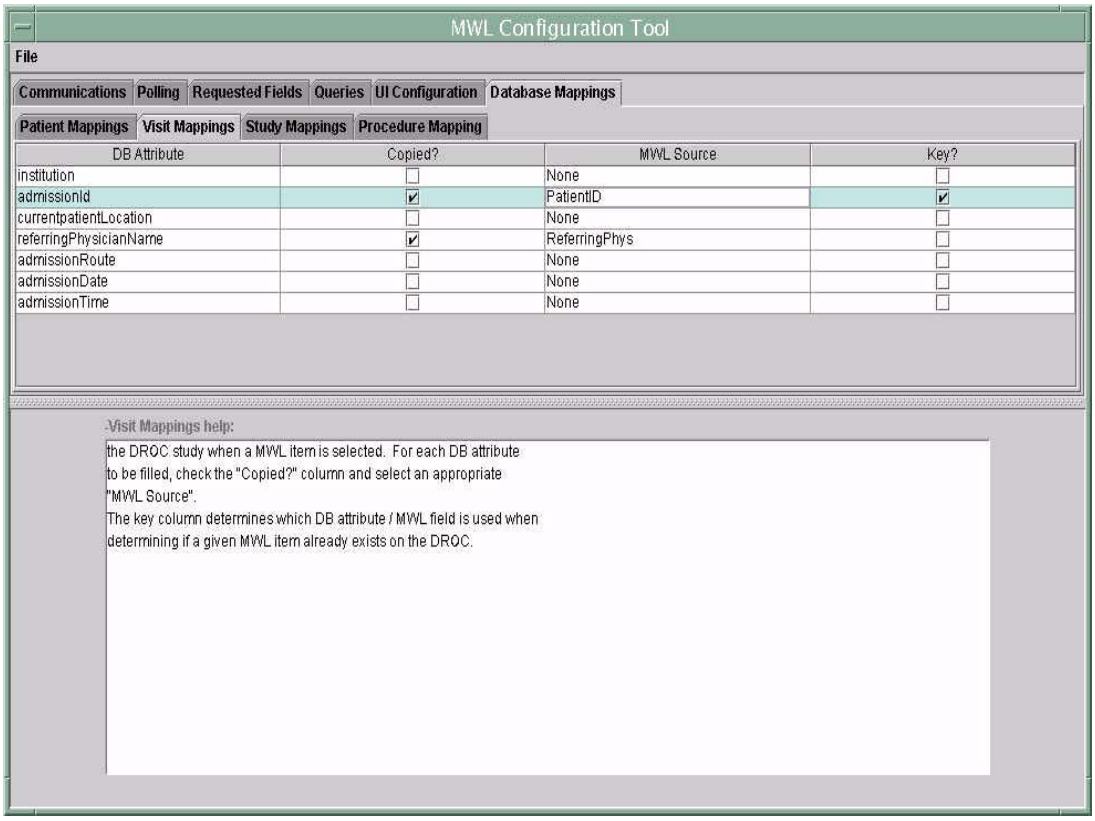


Fig. 35 Configure the MWL, DB Mappings - Visit Mappings

3. Open the **File** menu and **Save** the changes.
4. Reboot the DROC and check the MWL services again.

5. If you still run into problems, select the Tab card **Database Mappings -> Procedure Mapping** and change the **Study Code Field** from the default setting **ReqProcDescCodeValue** to **SchedStepID**.

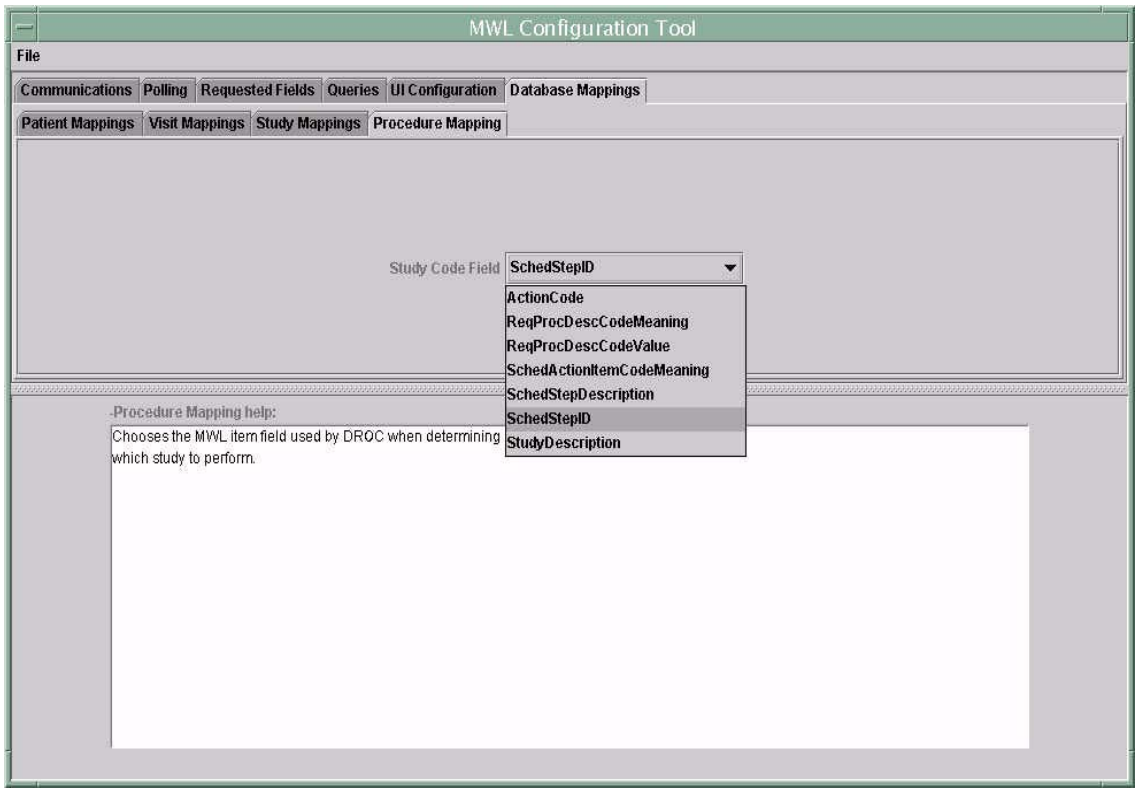


Fig. 36 Configure the MWL, Database Mappings - Procedure Mapping

6. Open the **File** menu and **Save** the changes.
7. Reboot the DROC and check the MWL services.

Backing Up DROC Acquisition Workstation Software Files

After initially setting up the system configuration files, or after making configuration changes, you should back up the critical Acquisition Workstation software files.

The file format is **MMDDhhmmss.mpb**.

1. Log in to the service software. As a result the **Service Tools** home page will display.
2. From the **Service Tools** home page, click on the following links:

   Maintenance: Backups -> Backup DROC

   The Backup DROC page is displayed.

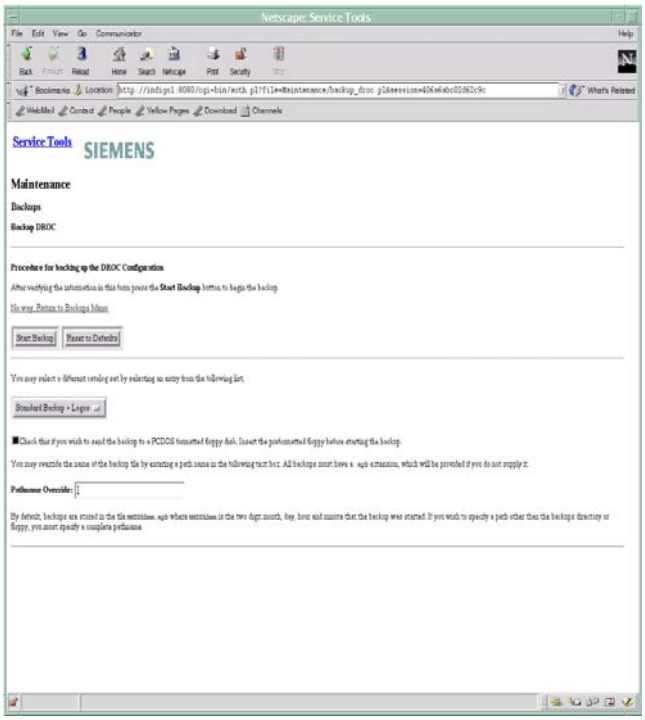


Fig. 37 Backup Tool

3. Ensure you back up both the **Standard Backup + Logos** files. Click on the **Standard Backup** button and change it to **Standard Backup + Logos.**
4. It is recommended that you back up to both a directory in the Acquisition Workstation file system (default directory on the disk is **/linx_mp/backups)** and to a removable medium (such as a floppy disk or CD-RW).

   - Click on **Start Backup** and it will be backed up to the hard disk.
   - Select **Check this if you wish to send the backup to a PCDOS formatted floppy disk** and click on **Start Backup** to save the backup to a floppy.

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Checking Image Quality

Although calibration is typically performed by the customer as part of normal system operation, calibration information is provided in the event that you are required to perform a system calibration.

To calibrate the system proceed as follows:

- First **calibrate the detector** and check the images for bad pixels.
- If you identify any bad pixels, **create the pixel map** and then **calibrate the detector**.

If you have to troubleshoot image quality problems, please see the chapter "Troubleshooting Image Quality" on Page 23 - 1.

Detector calibration

The detector captures charge in its TFT, which is then carried as an electronic signal through charge amplifiers and analog-to-digital conversion to generate a digital signal. Since the charge amplifiers are matched, small differences in their performance can result in differences in the X-ray densities detected for the same amount of X-ray.

Performing calibration allows the system to detect these small differences, along with other variables that can affect the digital signal output. The system can then adjust the output data to compensate for these differences.

When to Calibrate the detector

The detector must be calibrated:

- Once every two weeks.
- When the detector has been powered off.

NOTE	**Calibration must not be performed until at least one hour "after" the detector has been powered on to allow it to warm up.**

- When the room temperature has varied more than ±3°C (±5.4°F) from the last calibration.

If you require more detailed information regarding detector calibration, consult the users manual.

Proceed as follows:

1. Start the acquisition workstation and start the application by logging in as:
   user: apps
   password: ****
2. When the application is up and running, log in as a user (example: user **Andrea** with the appropriate password).
3. In the application's main window, close any open procedure and ensure that no patient is selected.
4. Open the **Admin** menu and select **Calibrate**.
   The calibration mode window is displayed. This window includes instructions for how to set the technique settings and take exposures for the calibration.
5. Change the technique settings as directed in your calibration panel.



6. Take an exposure.
7. The calibration window is displayed with the image.Click the **Accept** or **Reject** button.

   If you **Accept** the image, calibration runs (this takes approximately 30 seconds).

   If you **Reject** the image, the calibration panel is displayed. Correct the problem and return to step 6.

NOTE	**You would "Reject" an image if it exhibits any edge cut-off due to collimation or misalignment or if there are any artifacts from debris or obstructions.**

8. Wait until the message in the panel says **"Calibration".**

   If calibration is **successful**, a **"1"** is displayed in the calibration panel. Go to step 9.

   If calibration is **not successful**, adjust the technique settings and take another exposure.
9. Click the **Accumulate Calibration** button.
10. Repeat steps 6. through 9. until you have accumulated eight calibrations.
11. When you are finished with the calibration sequence, click the **End Calibration Sequence** button.

If you want to discard the accumulated calibrations and start over, click the **Restart Calibration Sequence** button.

Create a new pixel map

During the calibration function, you have the option of creating a new pixel map of the detector. The pixel map indicates which pixels in the detector's array might not be reading X-ray densities correctly and should therefore be ignored when the image is acquired. This is similar to a bad spot map for a computer's hard disk.

A new pixel map should be created when an excessive amount of pixel dropout is occurring repeatedly on images displayed in the Image Preview window.

To create a new pixel map:

1. Start the acquisition workstation and start the application by logging in as:
   user: apps
   password: ******
2. Log in as a user (example: user **Andrea** with the appropriate password).
3. In the application's main window, close any open procedure and ensure that no patient is selected.
4. Click **Admin** on the menu bar and select **calibrate**.
   The calibration mode window is displayed. It includes a **Create New Pixel Map** button.

5. Click the **Create New Pixel Map** button.
   The **Calibration - - New Bad Pixel Map** panel displays.

NOTE **If you want to end the new pixel map operation at this point, click the End Calibration button.**

6. Change the technique settings, as directed in the calibration panel.



7. Take an exposure.
   The calibration window is displayed with the image.
8. Click the **Accept** or **Reject** button.

   If you **Accept** the image, the new pixel map is created.

   If you **Reject** the image, the calibration panel is displayed. Correct the problem and return to step 7.

NOTE **You would "Reject" an image if it exhibits any edge cut-off due to collimation or misalignment or if there are any artifacts from debris or obstructions.**

9. When you are finished with the new pixel map operation, click the **End Calibration Sequence** button.

If you want to discard the accumulated calibrations and start over, click the **Restart Calibration Sequence** button.

Quality Control Manual Tests

Perform the annual acceptance tests, except test 11, of the **Quality Control Manual (SPB7-250.623.02...)** and fill out the **Test Protocol** (part of the Quality Control Manual) accordingly.

You'll find the quality control documentation in the **Instruction for Use** binder, shipped with the system.

Depending on the location of the installation, the corresponding Quality Control Manual has to be used, in accordance to the documentation language key, e.g. for the **USA** the Quality Control Manual (SPB7-250.623.02.xx.24) has to be used.

Make a note in the **Installation Protocol** (SPB7-250.813.01...) that the Quality Control Manual tests have been performed**.**

Remarks to the quality control tests:

- **Tube voltage measurement & reproducibility**
  The Quality Control Manual suggests the use a non-invasive kV meter. If you don't have such a measurement device in your district office, use a scope to measure the kV. Connect the oscilloscope as follows:

  Channel 1 to measuring point **HV_ACT** **(actual value)** (1 V = 5 kV) on the D750.

- **Beam quality (HVL)**
  The HVL values are supplied with the system (Prüfprotokoll_1) and don't have to be measured again with the first installation of the system. You need the HVL value for the **Mean glandular dose** test.
  The Prüfprotokoll_1 is located in the technical documentation binder in the folder Certificates.

Service PC and measuring instruments

Saving the configuration file of the MAMMOMAT stand

- Enter the service software on the service PC.

NOTE	**Make sure that the backup floppy is inserted.**

Main menu:

1. Select **Configuration ⇨Save config file**.
2. Press <F2> to save data.

Reset the exposure counter

Main menu:

1. Select **Service ⇨Reset exposure counter**.
2. Delete the error memory with <Y>.

Deleting the error buffer

Main menu:

1. Select **Service ⇨Delete error buffer**.
2. Delete the error memory with <Y>.

Saving the MAMMOMAT Parameters

Main menu:

1. Select **Backup ⇨Copy installation area to floppy ⇨All**.
2. Leave the program with <F10> when the backup is ready.

NOTE	**Keep the backup floppy with other documentation for the MAMMOMAT *Novation*^{DR} in question.**

Remove the measuring instruments

1. Turn **OFF** the MAMMOMAT system.
2. Remove the service PC.
3. Remove connected measuring instruments.

Checking the protective ground resistance

Using the protective ground wire tester, measure the resistance between the protective ground terminal in the stand and all metallic parts of the equipment which the patient/ operator may come in contact with, incl. all object tables.

The protective ground resistance must not exceed 0.1 Ω.

Mounting the cable duct covers

If not already done, mount the cable duct covers, see Chapter 4 "Installing the cable ducts".

Mounting the stand covers

⚠WARNING

The edges of the metal curtain of the stand are very sharp.

They may cause severe injury.

Remove the protective strips carefully when the covers are to be mounted. Store the strips in the holders provided on both sides of the curtain.

NOTE

When mounting the stand covers, make sure that the screws at the top of the stand are securely tightened and have functioning contact washers.

These screws are used to establish protective ground connections.

MAMMOMAT stand

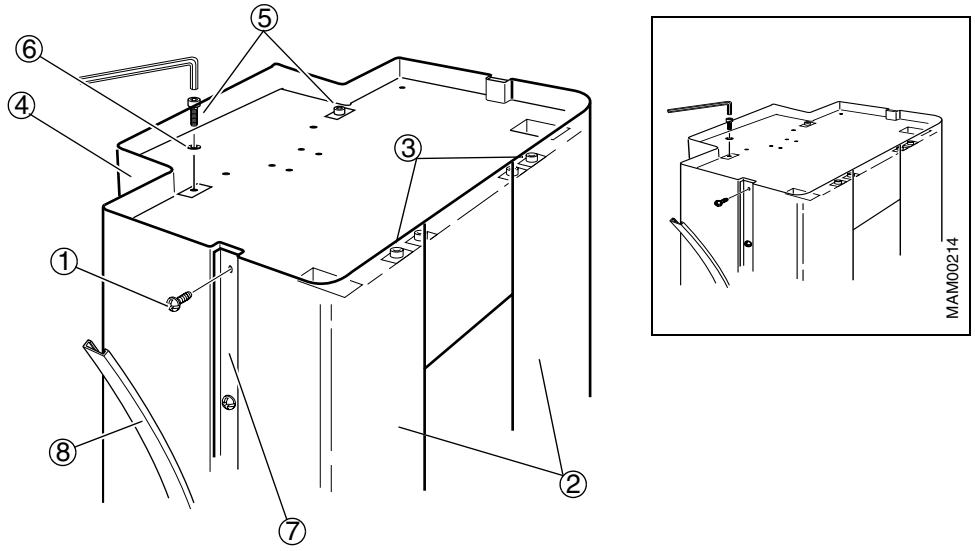


Fig. 1 Mounting the stand covers on a stand with single rear cover.

The covers are delivered with a protective plastic film, which shall be removed and discarded.

1. Make sure that clips are positioned over the holes where the screws (No. 1/Fig. 1) are to be fastened. These clips enable the screws to fasten the covers.
2. Fit left and right front covers (No. 2/Fig. 1) to the stand and fasten with screws and contact washers (No. 3/Fig. 1).
3. Fit the rear cover (No. 4/Fig. 1) to the stand and fasten it with screws (No. 5/Fig. 1) and contact washers (No. 6/Fig. 1).
   Be careful not to damage the cables at the cable outlet!
4. Fit the inner plastic strip (No. 7/Fig. 1) to the front and side covers and fasten with screws (No. 1/Fig. 1), eight on either side.
5. Press on the outer plastic strip (No. 8/Fig. 1).

Fitting the MAMMOMAT cap

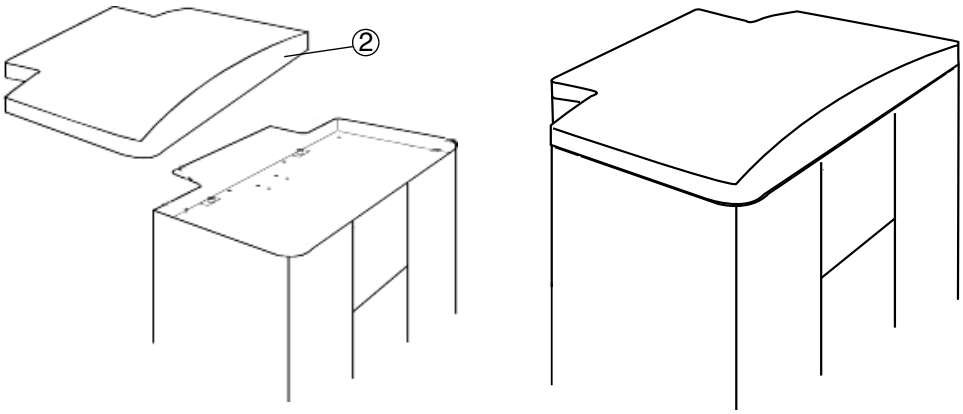


Fig. 2 MAMMOMAT cap

1. Place the cap on the top of the MAMMOMAT (No. 2/Fig. 2).

Face shield

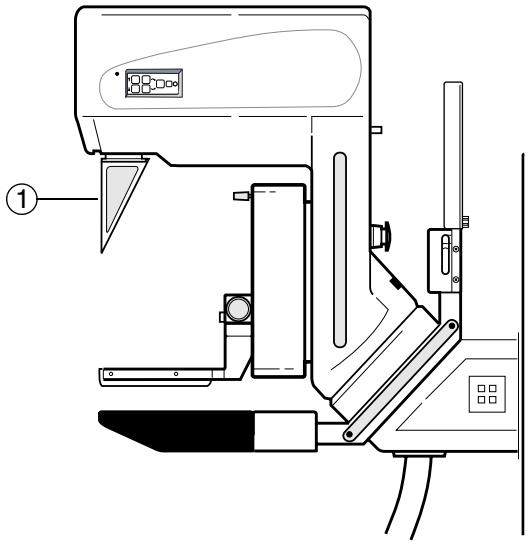


Fig. 3 Face shield

1. Slide the face shield (No. 1/Fig. 3) onto the holder for external diaphragms.

Warning label on control panel

The control panel warning label comes in eleven languages; English, German, French, Spanish, Italian, Dutch, Danish, Norwegian, Finnish, Greek, and Swedish. The warning labels are found in a plastic bag under thumb index 3 in the Technical Manual.

NOTE	**Warning label in English is provided on delivery.**

Choose the appropriate language and affix the label over the existing label on the control panel, see Fig. 4. Be sure to position the label properly before affixing it. The label sticks immediately.

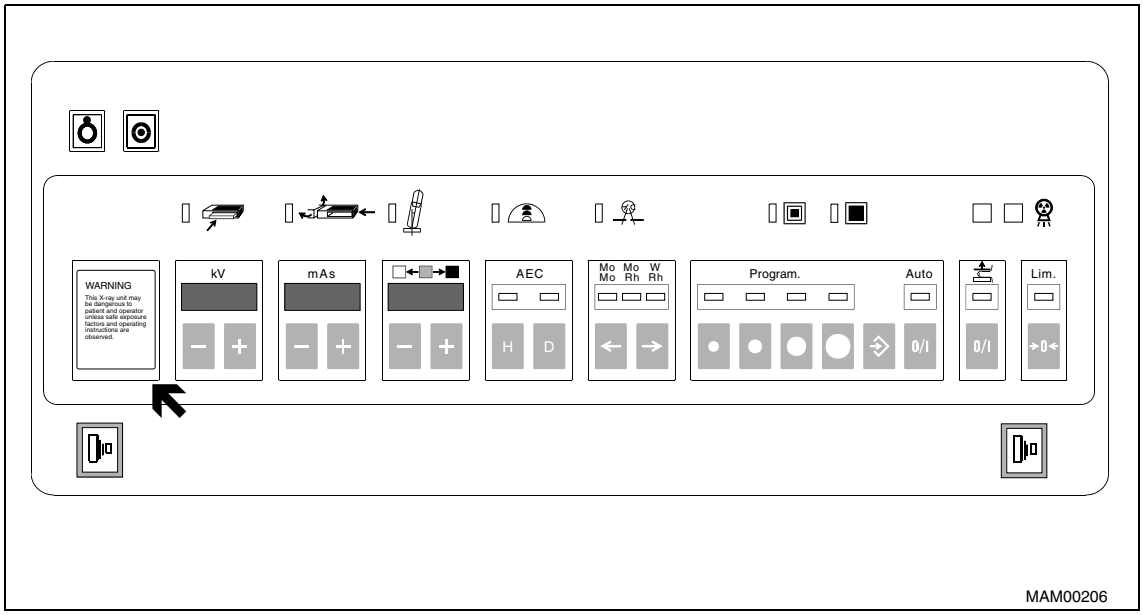


Fig. 4 Warning label on control panel

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Changes to previous version 22 - 1

Chapter	Page	Change
1	2,3	Updated auxiliary materials, mainly added the new dose meter and ion chamber.
3	1	The detector package has to be disposed locally.
7	4	Corrected the temp logger return process.
9	1	Added a note to assure, that all pulses are measured.
11	3	Corrected the positioning of the meter probe. Has to be off center.
12	1	Removed OPDOSE values and referenced to the Instructions of Use.
14	3,4	Corrected the date and time adjustments.
19	1	Added a note in regards to the network speed.
22		
23	7	Removed "Starting up and using the service PC - Dose Calculation program".
23	28 - 53	Removed and created a separat Software (BRICK) manual.

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Troubleshooting Image Quality

Various components, when operating incorrectly, can yield a variety of unacceptable imaging artifacts. These artifacts can come from anywhere along the chain of image capture, conversion, and display. The tables in this topic suggest the causes and corrective responses for particular problems.

A key step in analysis is to isolate the artifact to the component that is producing it. First, similar appearing artifacts can come from anywhere in the overall image chain. Second, the tendency to assume that the artifact is coming from the least known component must be avoided. For example, artifacts that appear to be coming from the detector may actually be coming from the output device or processing.

Isolation is the first step and should be done by using internally generated image patterns in the image chain to determine where exactly the artifact is being produced (“what is/what is not” the artifact analysis).

The following tables provide possible causes and corrective actions for those artifacts determined to be originating from various components.

Line Artifacts		
Problem	**Cause**	**Recommended Action**
Line Parallel to the Short Axis	Seam: • Seam correction algorithm not turned on; wrong algorithm selected. • Detector gain not calibrated properly. • Seam (lines 1535 and 1536) needs to be mapped out. Source lines: • detector not calibrated properly. • Line needs to be mapped out.	• Perform detector calibration procedure (refer to "Detector calibration" on Page 20 - 1). • Perform detector calibration procedure (refer to "Detector calibration" on Page 20 - 1). • Perform the bad pixel correction. (refer to "Create a new pixel map" on Page 20 - 2)
Line Parallel to the Long Axis	Line ends at seam or line partially defective (gate lines). • Detector not calibrated properly. • Line needs to be mapped out.	• Perform detector calibration procedure (refer to "Detector calibration" on Page 20 - 1). • Perform the bad pixel correction. (refer to "Create a new pixel map" on Page 20 - 2
Line Runs Through Seam	• Read out problem; HV setting time too short. • Hard copy device or processor artifact.	• Follow applicable problem solving.

Random Artifacts		
Problem	**Cause**	**Recommended Action**
Increase in Defective Pixels and Lines	Defective pixel file requires updating.	• Perform the bad pixel correction. (refer to "Create a new pixel map" on Page 20 - 2)

Structured Artifacts		
Problem	**Cause**	**Recommended Action**
Appearance of 24 "256 blocks" of different Densities or Counts	Gain calibration not turned on. Detector not calibrated properly.	Follow calibration procedure.
Image not appearing in One or More "256 blocks"	Detector defective.	Detector might have to be replaced. Contact the Service Center.
Image not appearing in one or more quarters of Detector	Detector defective.	Detector might have to be replaced. Contact the Service Center.
Garbled, scrambled, or truncated (from edges of long axis in) images	Poor cable connection. Electronic interference with or along cable.	Check pins and Detector connection to PXCM. Identify and isolate sources of interference; examine the cable pathway.
Fine Linear Pattern, Parallel to Long Axis, in One or More "256 Blocks" (usually more pronounced on an edge)	Electromagnetic noise interfering with Detector Read Out.	Shield Motors, power sources, and so on, located in proximity to the detector.

Other Artifacts		
Problem	**Cause**	**Recommended Action**
Density	Image is too dark or light.	Verify LUT curves are properly set.
No Image or Very High Exposure Required to Obtain an Image	HV setting incorrect. HV contact failed.	Check **pac.cfg** for correct setting. Replace detector.
High Contrast Objects Appear as Ghost Image	Detector erase not working correctly.	Check **pac.cfg** for correct settings. Check for detector component failure.
White lines towards the center of panel (Bar Code)	Detector defective.	Detector might have to be replaced. Contact the Service Center.
Dark lines / weak lines	Lines need to be mapped out.	Contact the Service Center.
Poor image quality	Detector not calibrated to optimal operating temperature.	Allow proper warm-up time to normal operational temperature.
Distorted image with 256 blocks	Detector defective.	Detector might have to be replaced. Contact the Service Center.

Working with the service PC

Description of the syntax used in these instructions

<.....>	The indication of which function keys to press is given between these characters, for example <ENTER>, <ESC> etc.
CAPITALS	Capital letters indicate data which must be entered unchanged, for example the name of a register, file etc.
Italics	Italics represent data in which a value should be entered, e.g. for user name, the name of the technician should be entered.
[.....]	Square brackets enclose additions to commands which may be optionally entered.
Bold	Data relating to formats, user entries etc., which is important for the following entry, is shown in bold as it appears on the monitor screen.
————	This character indicates that at this point the space key must be pressed.
xx yy zz	Data can be entered in place of *"x, y, z"* (e.g. day´s date).
{...}	Curved brackets indicate that out of several terms listed one below the other, one must be selected.
	Important remarks are indicated with this box.
* * * * *	When the password is entered, only these characters are shown.
Menu Selection:	When several menus, programs, files etc. are presented for selection, they are shown in a box (program window). Selection is made with the <↓> and <↑> keys. The module selected is highlighted in the display.
<ENTER>	Every entry must be confirmed with the <ENTER> key.
<ESC>	ESC allows paging back through the program.
<xx> + <y>	Some functions are selected by pressing two keys simultaneously. Procedure: Press, for example, the <Shift> key and keep it depressed, press the <*> key and then release both keys.
<F1>	Key <F1> calls up a selective help text.
<F10>	Key <F10> exits the program.
PLD	Programmable Logic Device on the AEC board (D701).
Flash	Memory device on the AEC board (D701).
OS	Operating System, e.g. "Microsoft® Windows®"

BIOS	Basic Input and Output System, a program stored in the computer hardware which launches start-up functions upon computer power-up.
XXX ⇨ XXX ⇨ XXX ⇨ XXX	This shows where a particular subroutine can be found. For example: **Main menu ⇨Configuration ⇨AEC ⇨Sensitivity correction**

Connecting the service PC

The service PC must be connected with connecting cable part no. 99 00 440 RE999 to the p.c. board in the generator (do not insert the diskette in the drive yet).

Configuration of the service PC

All Service Programs use the RS232 port in order to communicate with the MAMMOMAT. This port is usually handled as COM1 by the OS of the service PC. Modern PC's can be equipped with new types of communication hardware, e.g. infrared port and built-in modem, which may act as COM1 or share resources with COM1. This could cause malfunction of the Service Programs for the MAMMOMAT, which requires the OS and computer BIOS to be re-configured.

The following procedures are designed to ensure general compatibility with the OS's Windows® 2000 Pro on modern PC's. If the settings are saved, this procedure has to be done only once.

Configuration of computer BIOS

1. Enter the BIOS setup, usually done by pressing e.g. <F2> during the boot sequence of the BIOS.
2. Find the configuration of the IrDA (Infrared device) port and disable it.
3. Find the configuration of a built-in modem and make sure it is configured as COM3.
4. Find the configuration of COM1 and make sure it uses the interrupt IRQ 4 and the memory address range 03F8 - 03FF.
5. Save the BIOS settings and restart the PC.

Configuration of Windows® 2000 Pro

1. Choose Settings from the Start Menu.
2. Choose Control Panel.
3. Choose System.
4. Choose the tab Hardware.
5. Press the button Device Manager.
   If the IrDA-port was disabled in the computer BIOS, it should not be present in the list of available hardware. If the IrDA is present anyway and its icon is not marked with a red cross:
6. Double-click on the device row.

7. Choose the tab General in the dialog box that appears.
8. In the section Device Usage, change the status to "Disabled in the current hardware profile".
9. Exit the dialog by pressing the OK button.

Having performed the configurations described above, the Service Program should be able to communicate without difficulties.

Starting up and using the service PC

1 Switch on generator and service PC.

After initialization, the service PC shows: **C:\>**

2 Now insert the diskette with the service program.

3 Select the appropriate drive {A:} {B:} and then press <ENTER>.

The screen shows: **A:\>** or **B:\>**

4 Start the service program by typing 'SERVICE' (extension -c if you have a color display), then press <ENTER>.

The program asks for the user's name: ***Your name, please***

Type the name of the technician, for example NN, and then press <ENTER>.

5 The program asks for the password: ***Password, please***

Type the password (********) and then press <ENTER>.

The display window shows: ***Main menu***

6 Select the program part to be used with keys <↑> and/or <↓>, then press <ENTER>.

The program part selected is shown with a background: ***Configuratio***

If necessary, additional subroutines can be similarly selected here.

7 Make the necessary entries in the appropriate part of the program.

Save the entered data with <F2>. Page back in the program with <ESC>.

The appropriate instructions are shown on the monitor.

End the procedure with the service PC using <F10>.

Troubleshooting PC connection

If communication with the *MAMMOMAT Novation*^{DR} still cannot be established, follow the instructions in this section. The following procedure will disable the buffering of the RS232 port. This example is for Windows® 2000 Pro.

1. Choose Settings from the Start Menu.
2. Choose Control Panel.
3. Choose System.
4. Choose the tab Hardware.
5. Press the button Device Manager.
6. Expand the row Ports.
7. Double-click on the COM1 row.
8. Choose the tab Port Settings.
9. Press the button Advanced.
10. Uncheck the check box Use FIFO Buffers.
11. Exit the dialog by pressing the OK button.

DROC Acquisition Workstation Login Accounts

NOTE **Login names are not case sensitive but must be either all upper case or all lower case letters.**

There are two sets of user accounts, one set for logging into the Acquisition workstation's operating system, and another set for logging in to a DROC Acquisition Workstation software session. After logging into the operating system during startup using one of the DROC-related login accounts, only the DROC Acquisition Workstation software user logins related to that operating system login level will be available when prompted to start a session. They, in turn, determine what functionality will be available in the DROC Acquisition Workstation software.

The DROC-related **user logins for the operating system** that come with a standard software installation are:

- **tech**, for technologists.
  The **tech**-level users have access to day-to-day functions and administrative procedures performed by technologists.
- **mgr**, for managers.
  The **mgr**-level users have access to all DROC Acquisition Workstation software functions intended for customers - that is, all the day-to-day and administrative functions performed by technologists plus additional administrative functions intended to be available only to system administrators or radiology managers.
- **apps,** for applications.
  Reserved for vendor service and applications representatives, **apps**-level users have access to all functions, including service-related functions.

In addition, there are some special operating system logins, no DROC Acquisition Workstation graphical user interface is started:

- **reboot.** Allows the user to initiate a reboot from the Solaris login screen.
- **shutdown.** Allows the user to power down the Acquisition Workstation.
- **root**, for service
  The **root**-level users have access to all operating software. It is used to load software packages.

In addition, there are some special Netscape logins for the Service Software.

- **service**, for service
  Is used to establish a web connection to the service software located on the DROC Acquisition Workstation.

The BRICK operating software can be reached via Netscape with the URL **http:/brick** and has the accounts:

- **root**, service
  The **root**-level users have access to all operating software. It is used to load software packages.

Normal Operation Sequence

This topic describes how the DROC coordinates their operation during a normal sequence of events. A flowchart of the normal workflow is illustrated as follows. Understanding the normal operation of the system facilitates troubleshooting to isolate the possible causes of problems.

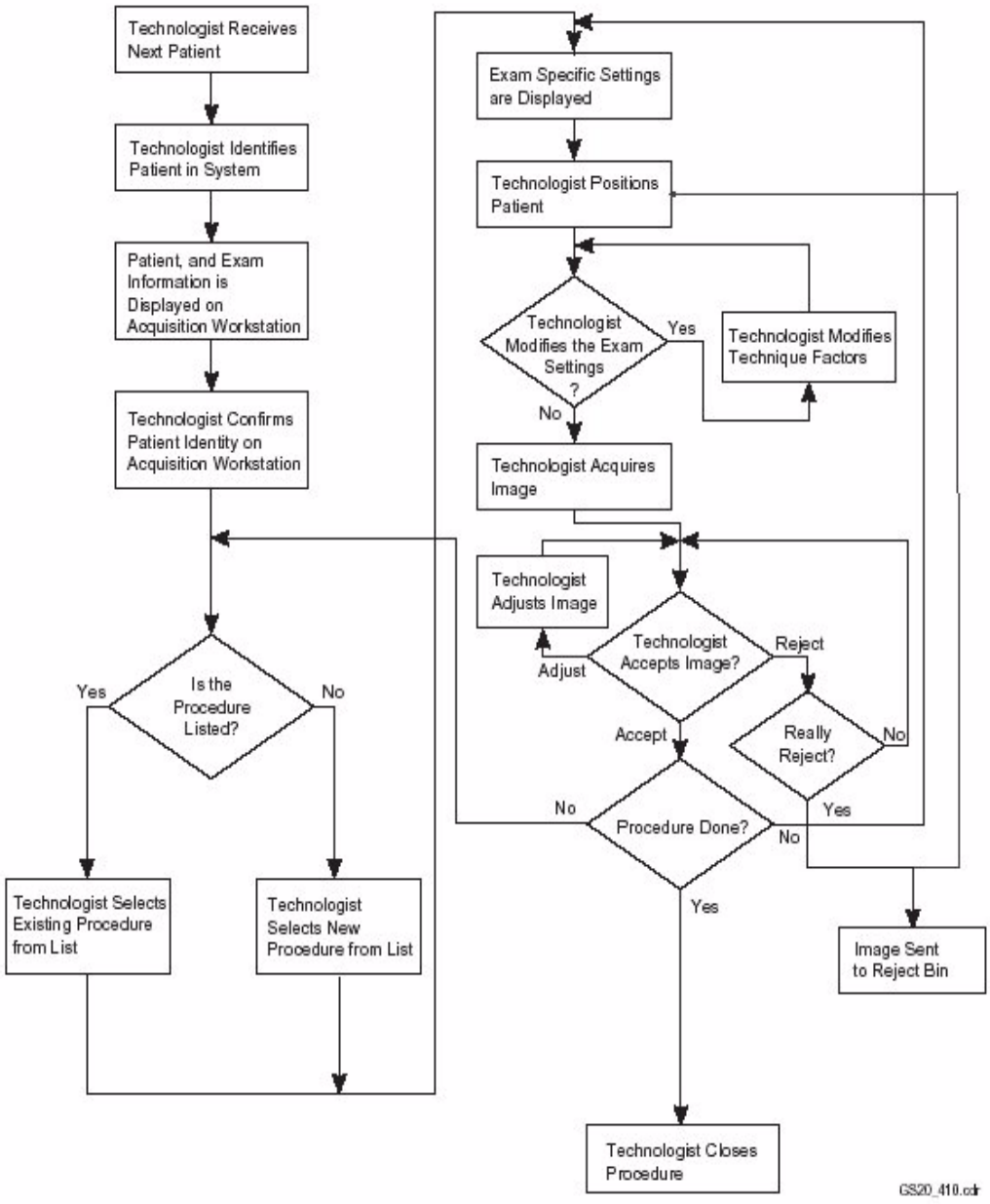


Fig. 1 Operation sequence

Opening the DROC service software

The Service Tools interface is implemented via web pages, accessible through a web browser application on the Acquisition Workstation.

To launch the Service Tool from the Acquisition Workstation:

1. Log in to the FFDM Acquisition Workstation operating system as **apps** and use the appropriate service password.

NOTE	**If this is the first time that the CPU's operating system has been logged in to, you might be prompted to register. Choose Never.**

2. Locate and launch the web browser. When the browser launches, the Service Tools logon page is displayed.

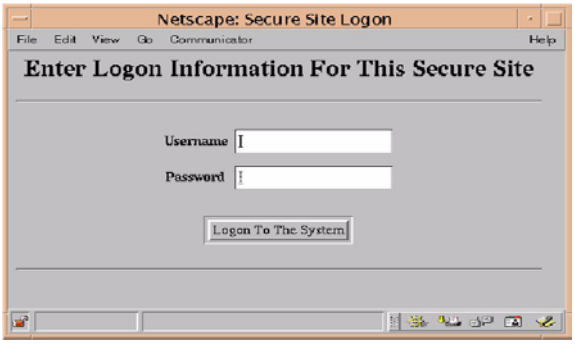


Fig. 2 Service Software Login

3. Log in with the username service and the proper password, then click the Logon To The System button.
4. The Service Tools home page is displayed.

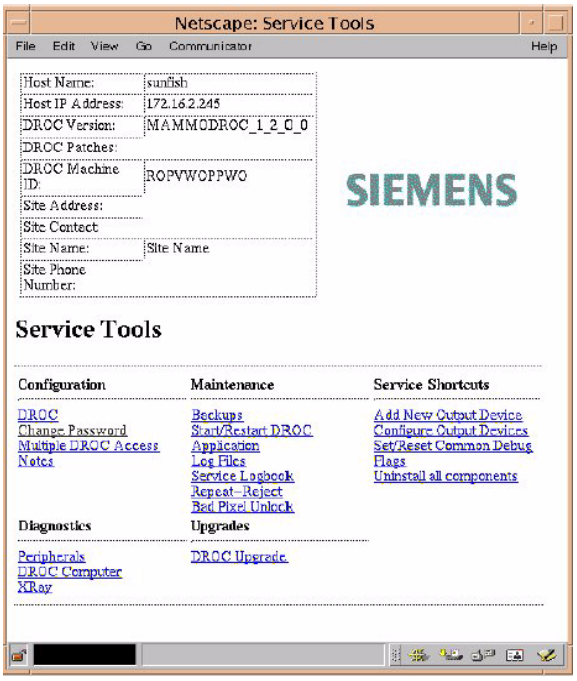


Fig. 3 Service Software grafical user interface

AEC calibration

Array AEC Dark Offset Calibration

Make the Dark Offset calibration in normal mode (non-magnification) and with the magnification table by placing a large steel plate or lead apron over the detector cover.

1. Select **H** on the control console.
2. Take several exposures in AEC mode (23kV and Mo/Mo) after the detector is in equilibrium (array on for >20min).
3. Connect the Service PC to the detector to be able to read the array sequence. Use the HyperTerm with the following settings:
   Baud: 38400
   Parity: None
   Bits: 8
   HW setup: none
4. Take 10 exposures with various sensor selections.

NOTE

The error messages 578, 579 and 504 on the control console are quite normal since the detector does not receive X-ray.

In the Application graphical user interface you will see the error message E77.

Calculate the mean AEC value of all dark prediction shots. (AEC data are displayed on the Service PC).

The following 4 lines are displayed after every AEC exposure:

```
Sensor Selected: 16
Background Value: 1423323
Foreground Value: 1441487
AEC Value: 18164
```

Measurement	Sensor selected	AEC value
1		
2		
3		
4		
5		
6		
7		
8		

Measurement	Sensor selected	AEC value
9		
10		
	Mean AEC value	

5. Open the Netscape application and establish a connection to the BRICK by entering the URL (**http://brick/**).
   Username: **root**
   Password: ****
6. Select **Brick** and then **Brick AEC Configuration.**
7. Select **Modify Settings**, scroll to **Modify Array Dark Offset** and enter the **mean AEC value** in the field **Dark Offset Value**. Enter the same **mean AEC value** in **Modify Array Mag Offset.**
8. Enter the mean AEC value for both short-term (Load) and for long-term (Save) by choosing the **Duration of Change** button.
9. After the changes have been made, scroll to the bottom of the page and click **Back to the Brick Control Panel...**
10. Check the setting with the **status** button.

AEC Calibration Tool

The following sections describe the procedure for using the AEC Calibration Tool to generate **goal images** for AEC.

Starting the Utility

- If the DROC (Direct Ray Operation Console) application is running, kill it using the task manager. Click on the field **Kill All**.
- If you need to log in, log in as user **apps**, then immediately open the console window from the icon and type **Control-C**. You must do this within five seconds to prevent the DROC application from starting.
- Open a terminal window and change to the following directory.
  cd /opt/linx_mp/opt/DRUL_0.6.3/tstbin
- Type **AecCalTool** in a terminal window.
  You should see progress information in that window. The AecCalTool Main Window will open. The main window will finish displaying when the DRAPI (Direct Ray Application Interface) initialization is complete.

  The main window is shown in the image below in Fig. 4

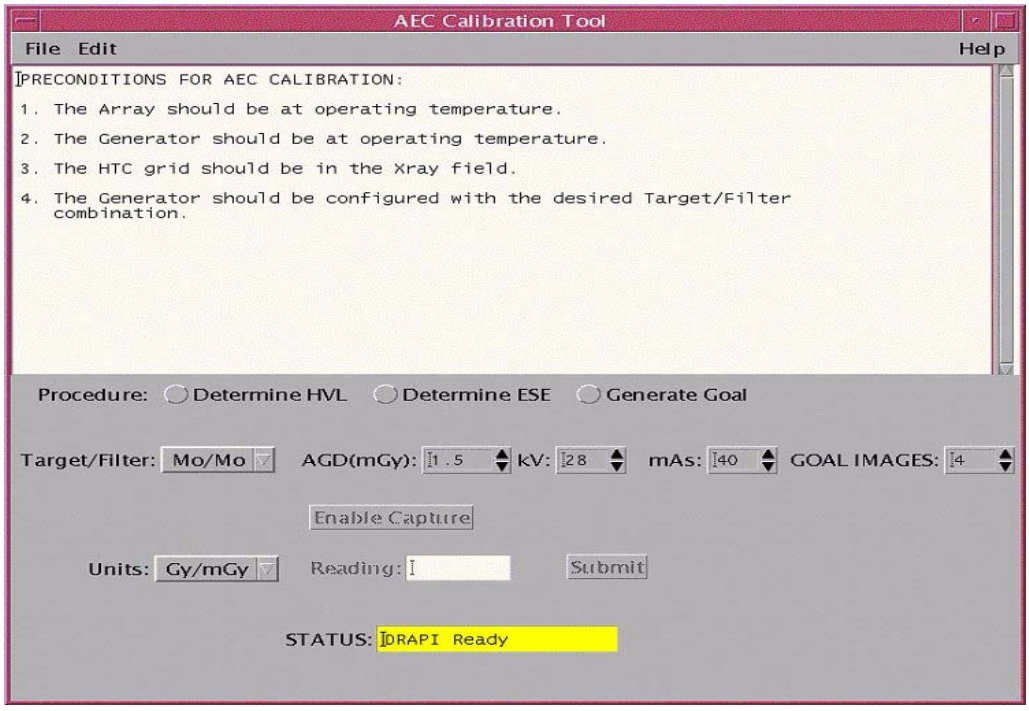


Fig. 4 Start the AecCalTool

The screenshot above (Fig. 4) shows the default configuration of the tool:

- Target/filter setting is Mo/Mo
- **Units** are set to **Gy/mGy**
- **AGD** is set to 1.5 mGy
- No procedure active

To stop the utility, click on **File**, then **Quit**.

Use the **kV** and **mAs** selectors to choose the settings to be used during exposure. Selecting in this window will not change the settings, but is used as a reminder to the user what the current generator settings are.

Determining the Half Value Layer (HVL)

If you need to determine the Half Value Layer, click on the **Determine HVL** button.

You have to do this for Mo/Mo, Mo/Rh and W/Rh.

If you already know the Half Value Layer and wish to proceed with the Entrance Skin Exposure determination, skip to the next section "Determine ESE".

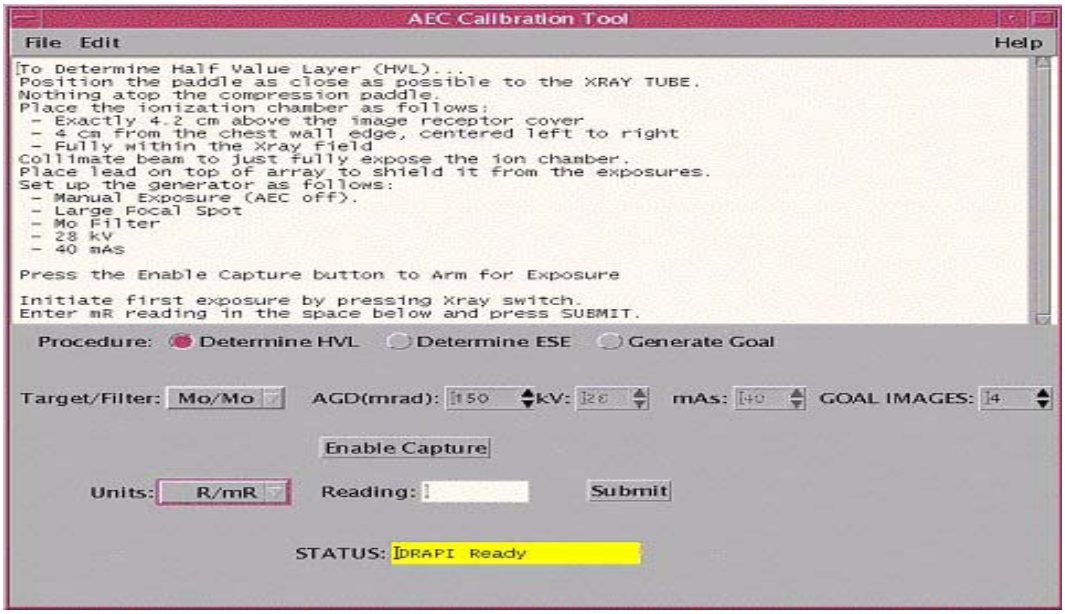


Fig. 5 Determining the Half Value Layer

The screenshot above shows:

- The **Determine HVL** procedure has been selected
- The **Units** have been changed to **R/mR**.
  In the USA it has to be set to **R/mR**, in Europe and in other countries it has to be set to **mGy**.
- The default **AGD** is now displayed in **mrad** instead of **mGy**

Instructions for generator and dosimeter configuration are displayed in the text window.

Once the setup is complete, click the **Enable Capture** button.

The status window will change from **DRAPI Ready** to **DRAPI Armed** and will turn from **yellow** to **green**.

Make sure the generator is configured properly and make the indicated exposure.

1. Select the desired units. Click in the **Reading** field and enter the dosimeter value in the appropriate units: mR (milliRoentgen) or mGY (milliGray).

   Make sure the entry is correct, then click **Submit**.

As the array and DRAPI recycle for the next exposure, the status window will change from **DRAPI Armed** to **DRAPI Not Ready** and will turn from **green** to **white**.

When the DRAPI is ready to be enabled for the next exposure, the status window will again say **DRAPI Ready** and will be yellow. The text window will instruct you for the next step. The amount of aluminum added in this step depends on the target/filter selection.

(Mo/Mo = 0.3mm; Mo/Rh = 0.3mm; W/Rh = 0.5mm)

2. Click **Enable Capture**. The last dosimeter reading you entered will be cleared.

   The status window will change from **DRAPI Ready** to **DRAPI Armed** and will turn from **yellow** to **green**.



3. Make sure the generator is configured properly and make the indicated exposure.
4. Click in the "**Reading**" field and enter the dosimeter value in the appropriate units
5. Make sure the entry is correct, then click **Submit**.

   As the array and DRAPI recycle for the next exposure, the status window will change from **DRAPI Armed** to **DRAPI Not Ready** and will turn from **green** to **white**.

   When the DRAPI is ready to be enabled for the next exposure, the status window will again say **DRAPI Ready** and will be **yellow**. The text window will instruct you for the next step. The total thickness of aluminum in this step depends on the target/filter selection.

   (Mo/Mo = 0.4mm; Mo/Rh = 0.5mm; W/Rh = 0.6mm)

6. Click **Enable Capture**. The last dosimeter reading you entered will be cleared.

   The status window will change from **DRAPI Ready** to **DRAPI Armed** and will turn green.



7. Make sure the generator is configured properly and make the indicated exposure.
8. Click in the **Reading field** and enter the dosimeter value in the appropriate units.
9. Make sure the entry is correct, then click **Submit**.

   As the array and DRAPI recycle for the next exposure, the status window will change from **DRAPI Armed** to **DRAPI Not Ready** and will turn from **green** to **white**.

10. When the DRAPI is ready to be enabled for the next exposure, the status window will again say **DRAPI Ready** and will be **yellow**. The text window will instruct you for the final HVL step.
11. Click **Enable Capture**. The last dosimeter reading you entered will be cleared.

    The status window will change from **DRAPI Ready** to **DRAPI Armed** and will turn green.

12. Make sure the generator is configured properly and make the indicated exposure.
13. Click in the **Reading field** and enter the dosimeter value in the appropriate units.
14. Make sure the entry is correct, then click **Submit**.

    The text field will display the Half Value Layer calculated.
15. Record the measured values in the **Installation Protocol** (SPB7-250.813.01...) **.**

Determine ESE

If you already know the HVL, click first on the **Determine ESE** button instead of the Determine HVL button.

A window will pop up prompting you to enter the HVL value.

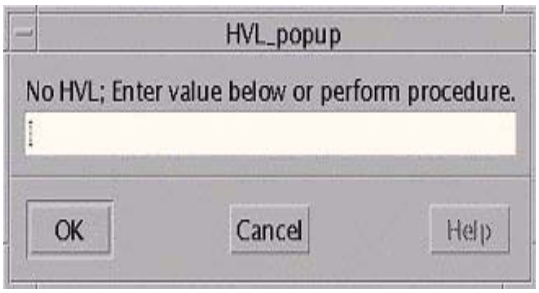


Fig. 6 Enter the HVL value

1. Enter the number and press **Enter** or click the **OK** button in the popup window.
2. Make sure the desired AGD is selected and click on the **Determine ESE** button to continue.

   Determining the Entrance Skin Exposure (ESE)
3. Select the desired **AGD** before continuing with ESE determination. Once the first ESE exposure has been performed, the **AGD** value cannot be changed.

4. Click on **Determine ESE**.

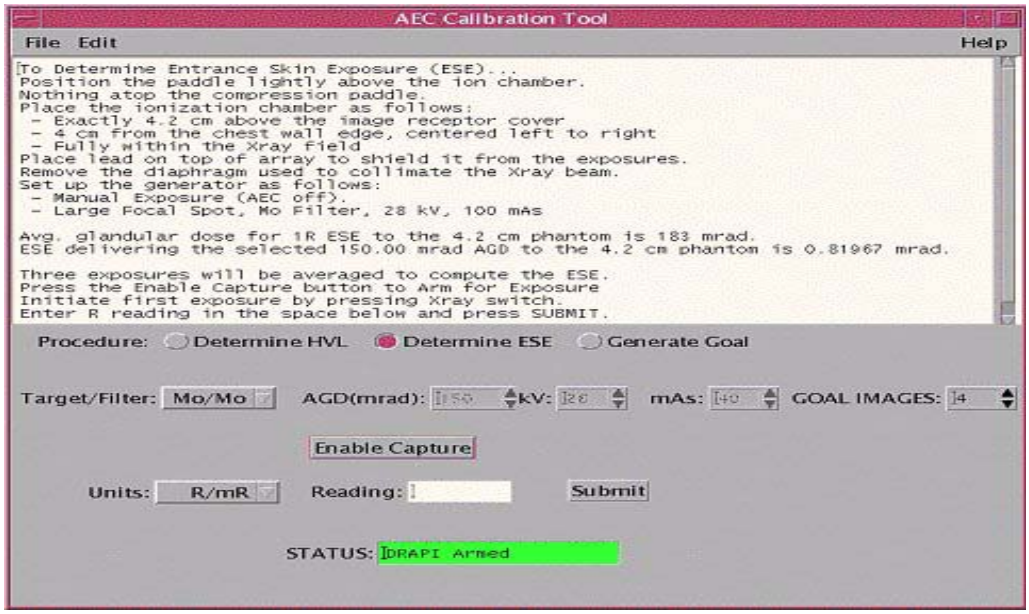


Fig. 7 Determine ESE

NOTE	**The screenshot above shows how the Status field turns green when displaying DRAPI Armed. The text field displays instructions, along with the ESE figures based on the HVL and the selected AGD in the selected units.**

1. As you did during HVL determination, click on **Enable Capture**, then make the indicated exposure.

   Enter the dosimeter reading in the appropriate units.

NOTE	**The scale of the units to be entered changes from mR to R if the R/mR units are selected, but remains in mGy if "Gy/mGy" units are selected.**

2. Repeat for the second and third ESE exposures.

   The text field will display the average of the three dosimeter values entered.

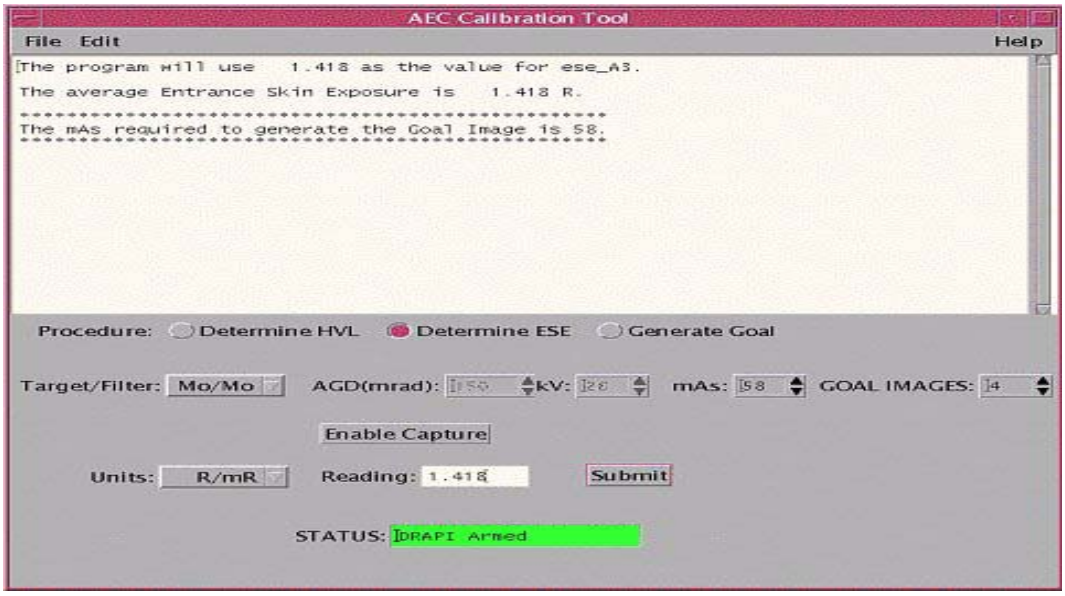


Fig. 8 Display the average of the three dosimeter values entered

The text field also displays the suggested **mAs** value to be used for goal table generation.

In most cases, the **mAs** suggested will not exactly match an **mAs** value to which the generator can be set. In this case it is recommended to use the closest lower **mAs** setting so that the desired AGD will not be exceeded during future AEC exposures.

Generating the Goal Image

Click on the **Generate Goal** button. You can do this even without Determining the HVL or the ESE provided you know the proper **mAs** to configure the generator.

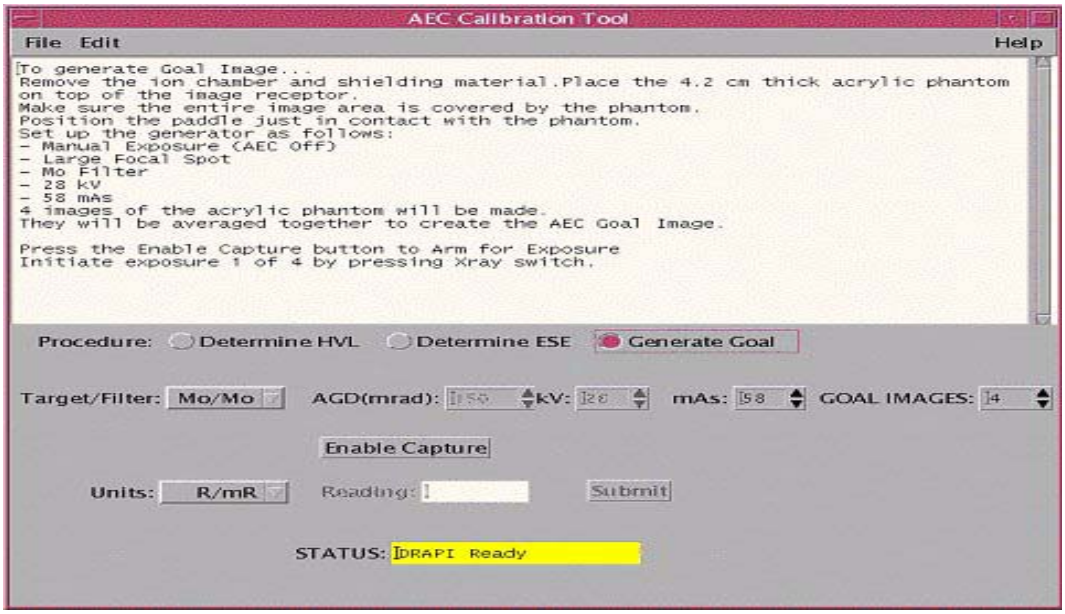


Fig. 9 Generate the Goal Image

1. Select the desired number of Goal images to average (1-4) before taking the first exposure.

   Follow the instructions in the text field for generator configuration.

NOTE **If you just finished the ESE determination, the suggested mAs appears both in the text field and in the mAs field. This merely serves as a reminder; the user must manually set the proper mAS on the generator.**

2. Enable Capture and expose as before.

   Part of the text scrolling in the initial command window will show **Writing image to file GOAL1.img** and then **Done writing file**.

3. If averaging more than one image, wait for the DRAPI to be ready again, then enable capture and expose again.
4. Repeat for all images to be averaged.
5. When the final image has been written to a file, the images will be averaged together (if more than one) and the goal table file will be generated. The file name for the goal table image is based on the target/filter selection.

   (Mo/Mo = goaltab1; Mo/Rh = goaltab2; W/Rh = goaltab3).

   The text display will change to show the number of averaged images. The text scrolling in the initial command window will show the following text.

NOTE **The text below may be interspersed with DRAPI image frame messages and represents a selected AGD of 1.5 mGy.**

```
Binning the goal image to make goaltab file goaltab1 for
Mo/Mo target/filter.
Reading image file... done.
 Generating binned image
 done.
Writing AEC image (448x512) file... done.
Writing mem image (28x32) file... done.
Image binning complete.
Opening goaltab1 for goaltab input
Opening brick:/tmp/goaltab1 for goaltab output
Reading goaltab1 for goaltab input
Read 896 goaltab entries.
Closing goaltab1
Writing brick:/tmp/goaltab1 for goaltab output
Wrote 3584 bytes via rfs.
```

```
Writing the value "15" to brick:/tmp/goaltab1 for AGD out-
put…
Wrote 4 bytes via rfs.
Closing brick:/tmp/goaltab1
Installing goaltab1 to long-term Brick configuration…
(/usr/local/bin/xrayconfig goaltab1 save /tmp/goaltab1)
"save" OK.
Goal Table goaltab1 successfully loaded on Brick.
**************************************
AEC Calibration procedure is complete.
**************************************
```

At this point, the system is ready to be used in AEC mode. There may be a problem loading the expanded goaltab file (3584 pixels plus 4-byte AGD value) into effective and short-term storage on the BRICK.

DROC Software re-installation

This chapter describes how to re-install the software on the DROC workstation from scratch.

Basically you perform the following steps:

- Installing the Solaris CDE operating system software
- Installing the Application Software and drivers
- Installing the detector specific configuration files
- Activate the Siemens application packages
- Restore your system backup
- Calibrate the system

Installing the Solaris CDE operating system software

1. Power up the Acquisition Workstation.
2. After the Solaris banner displays, press **STOP-A** keys simultaneously.
3. After the system prompts **ok**, insert the **CDE CD1** CD-ROM in the CD-ROM drive.
4. When the command prompt displays, enter the following command:
   boot cdrom
5. In the Select Language window, select **0**.
6. In Solo Locale, select **0**.
7. After the Solaris Installation Program window prompts, select **Continue**.
8. After the Identify System window prompts, select **Continue**.
9. In the Network Connectivity window, select **Yes** for Networked, select **Continue**.
10. In the DHCP window, select **No**, and then select **Continue**.
11. In the Host Name window, enter **your local host name**, e.g. **novation1,** as the host name, and then select **Continue**.
12. In the IP Address window, enter **your local IP address**, e.g. **172.16.2.79** for the IP Address, and select **Continue**.
13. In the Subnets window, select **Yes**, select **Continue**, and enter **your local netmask**, e.g. **255.255.0.0**, and select **Continue**.
14. In the IPv6 window, select **No** for Enable v6, and select **Continue**.
15. When the Confirm Information prompt displays, verify the information, and then select **Continue**.
16. In the Configure Security Policy window, select **No**, and then select **Continue**.
17. When the Confirm Information window prompt displays, select **Continue**.
18. In the Name Service window, select **No** for Name Service, and select **Continue**.
19. When the Confirm Information prompt displays, verify the information, select **Continue**.
20. In the Time Zone, select the region time zone, and then select **Continue**.

21. When the Confirm Information prompt displays, select **Continue**.
22. When the Solaris Interactive Installation window prompt displays, select **Initial**, and select **Continue**.
23. When the Select Geographic Region window prompt displays, select ONLY **U.S.A. (en_USIS008859-1)**, and then select **Continue**.
24. When the Select Software window prompt displays, select **Entire Distribution** in software group, and then select **Continue**.
25. In the Select Disks window, click **Available Disks** and bring it over to the **Select Disk** section, and then select **Continue**.
26. In the Preserve Data window, select **Continue**.

NOTE	**If rebuilding the Acquisition Workstation, when the CD disk is not the option, do not process anything here.**

27. In the Automatically Logout File Systems window, select **Auto Layout**.
28. In the Auto Layout File System window, leave default ones (2) checked and then select **Continue**.

29. In the File System and Disk Layout window, select **Customize**. The default is set already. Make changes to the default setting as shown.

Settings for a 80 GB disk

Primary Disk				Secondary Disk		
0	/	5120		**0**	/images	76314
1	swap	6802		**1**		
2	overlap	19091		**2**	overlap	76314
3				**3**		
4	/opt	4096		**4**		
5	/linx_mp	2048		**5**		
6				**6**		
7	/export/home	1024		**7**		

Settings for a 40GB disk

Primary Disk				Secondary Disk		
0	/	5120		**0**	/images	38162
1	swap	6802		**1**		
2	overlap	19091		**2**	overlap	38162
3				**3**		
4	/opt	4096		**4**		
5	/linx_mp	2048		**5**		
6				**6**		
7				**7**		

The installation of this package will take approximately 1 hour.

30. After entering the File System and Disk Layout settings, select **Continue**
31. Select **Continue** again.
32. When Profile window prompt displays, verify the settings, and then select **Begin Installation**.
33. Select **Auto Reboot**, and verify the appropriate Reboot password. Enter the password again.
34. When Solaris prompts disk 2, insert CD2.
35. When the installation is complete and Solaris has rebooted, login as **root** with the appropriate password.
36. When prompted, choose the CDE Desktop Setting.

Installing the Application Software and drivers

To install the application software on the Acquisition Station:

1. Log in to the Solaris operating system as **root** with the appropriate password.
2. Load the FFDM Acquisition Workstation software **Drivers** CD-ROM into the Acquisition Workstation's CD-ROM drive.
3. Open a terminal window. To do so, use the right mouse click and select

   work menu -> Tools -> Terminal

   As a result a new window will pop up.
4. Change the directory to the CD-ROM by entering:

   cd /cdrom/cdrom0

   You must wait until the "**#**" character comes back. This will take approximately 1 hour.
5. Eject the CD-ROM by entering:

   cd ..

   eject cdrom
6. Reboot the system by entering:

   reboot
7. Log in to the Solaris operating system as **root** with the appropriate password.
8. Run the Driver installation by entering:

   ./mpinstall1 -force
   The drivers are installed.
9. Eject the CD-ROM by entering:

   eject cdrom
10. Set the monitor resolution by entering:

    m64config -res 1280x1024x75
11. Load the **Application Software** CD-ROM into the Acquisition Workstation's CD-ROM drive.
12. Run the software installation by entering:

    cd /cdrom/cdrom0

    ./mpinstall2 -force
    The application software is installed.
13. If the system is upgradable, the install procedure asks you if you want to make use of the previous configuration. Answer **no** to the prompt question about upgrading.
14. When the install procedure is complete, eject the CD-ROM, and then reboot the system by entering:

    reboot
15. After the system reboots, log in to the operating system as user **apps** with the appropriate password.
16. Log in to the FFDM Acquisition Workstation software to verify that it is operational.

Installing the detector specific configuration files

The detector specific configuration files have to be loaded, to be able to start the application software. You will find the configuration files on a CD-ROM that is supplied with the system and is located in the back of the technical manuals binder.

1. Log out of the Sun and log back in as user **root.**
2. Insert the CD-ROM containing the configuration files into the CD-RW on the Sun Computer.
3. On the desktop, open the **File Manager**, select the data directory **/opt/linx_mp/opt/DRUL_0.6.3/data**.
4. Open a second **File Manager**, select the appropriate device, CDROM1.
5. In the device window, select the **MPxxxx.cfg, MPxxxx_final.map** and **MPxxxx.smj** (if this file exists) file (where xxxx = the Array Serial Number) and drag it to the data directory **/opt/linx_mp/data**.
6. The **MP** in the file names must be in upper case letters. You must rename these files to e.g. **MPxxxx.cfg, MPxxxx_final.map** and **MPxxxx.smj**. To do so click in the File Manager on the file name and change it from **mp** to **MP**.
7. Close all desktop windows.
8. Reboot the entire system

Activate the Siemens application packages

Before you can restore your local backup the **DR/Siemens Digital Mammography** Package has to be installed.

To install the **Modality Worklist Server** Package proceed as follows:

NOTE	**Make sure that the DROC application software is running with the account 'apps'.**

1. From the Service Tools home page, click on the following links:
   DROC -> Software Configuration -> Add Software resources -> Browse Directory ./installable packages

   The **Add Software Resource to the System Configuration** page displays.

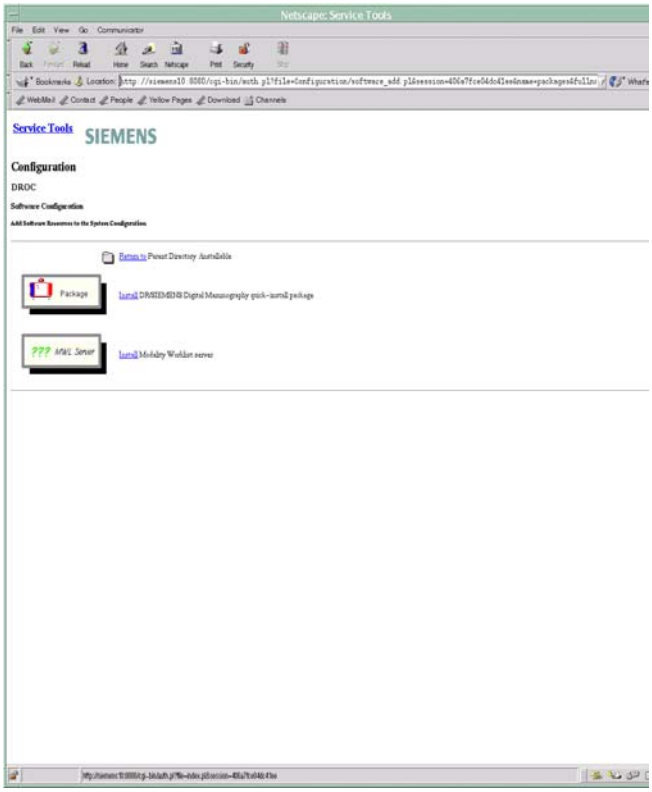


Fig. 10 Install the DR/Siemens Digital Mammography Package

2. Click the **Install** link for the **DR/Siemens Digital Mammography** package.
3. Reboot the DROC to enable the resource package you just selected

After rebooting log in as user **apps**.

Restore your system backup

1. Login to the Service Tools.
2. From the Service Tools home page, click on the following links:
   Maintenance: Backups -> Restore DROC

   The Backup DROC page is displayed.



Fig. 11 Restore Tool

3. Insert the floppy that contains the backup file(s), select the appropriate options, see Fig. 11 and click on **GetList** to retrieve all available backups on the floppy.
4. Select the newest backup and click on **Start Restore**.
5. Reboot the system.

Calibrate the system

As a final step you have to calibrate the system and visually check the image quality.

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